Fig.1

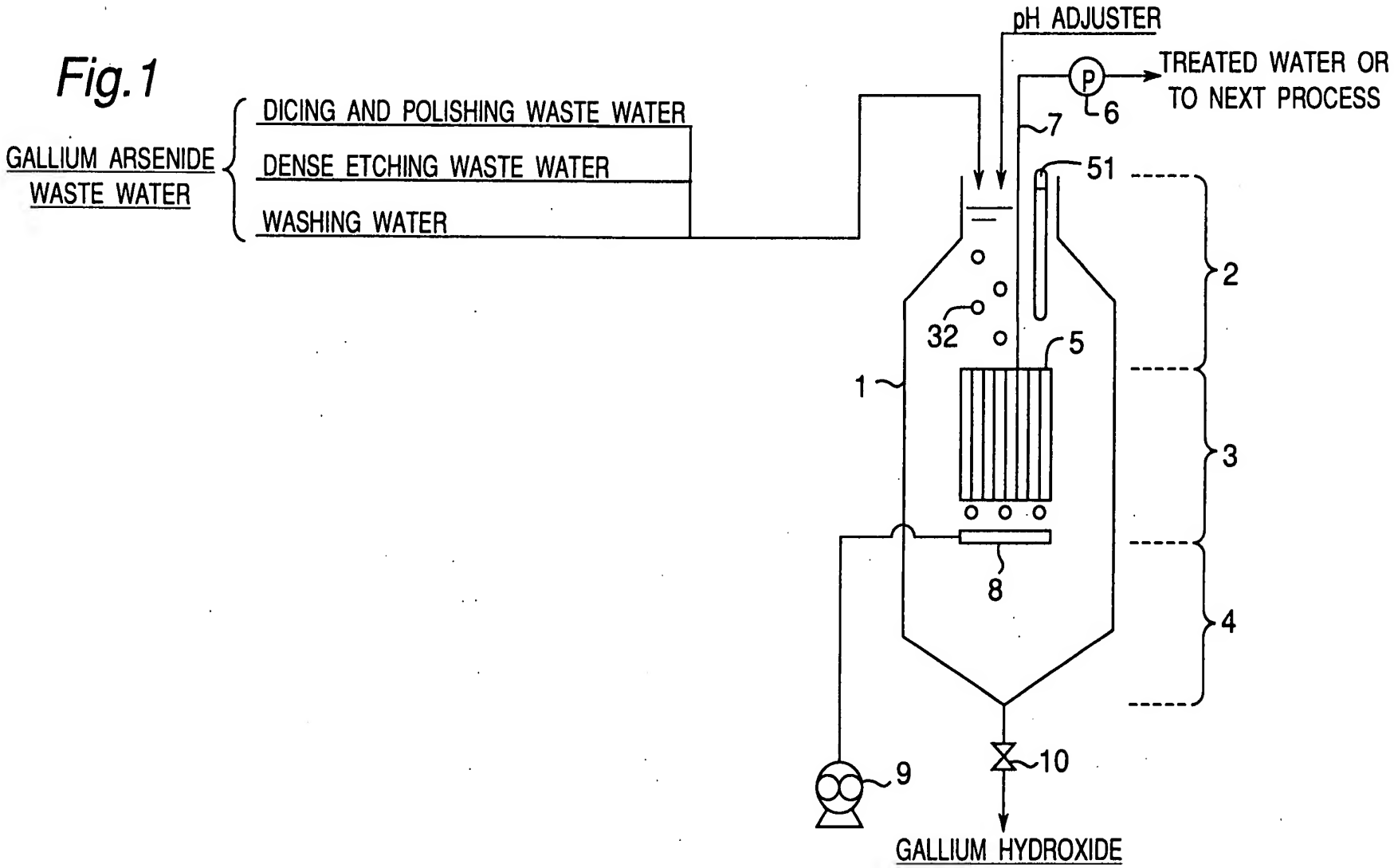

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
TREATED WATER OR TO NEXT PROCESS
P
6
7
51
2
32
5
1
3
8
4
9
10
GALLIUM HYDROXIDE

Fig.2

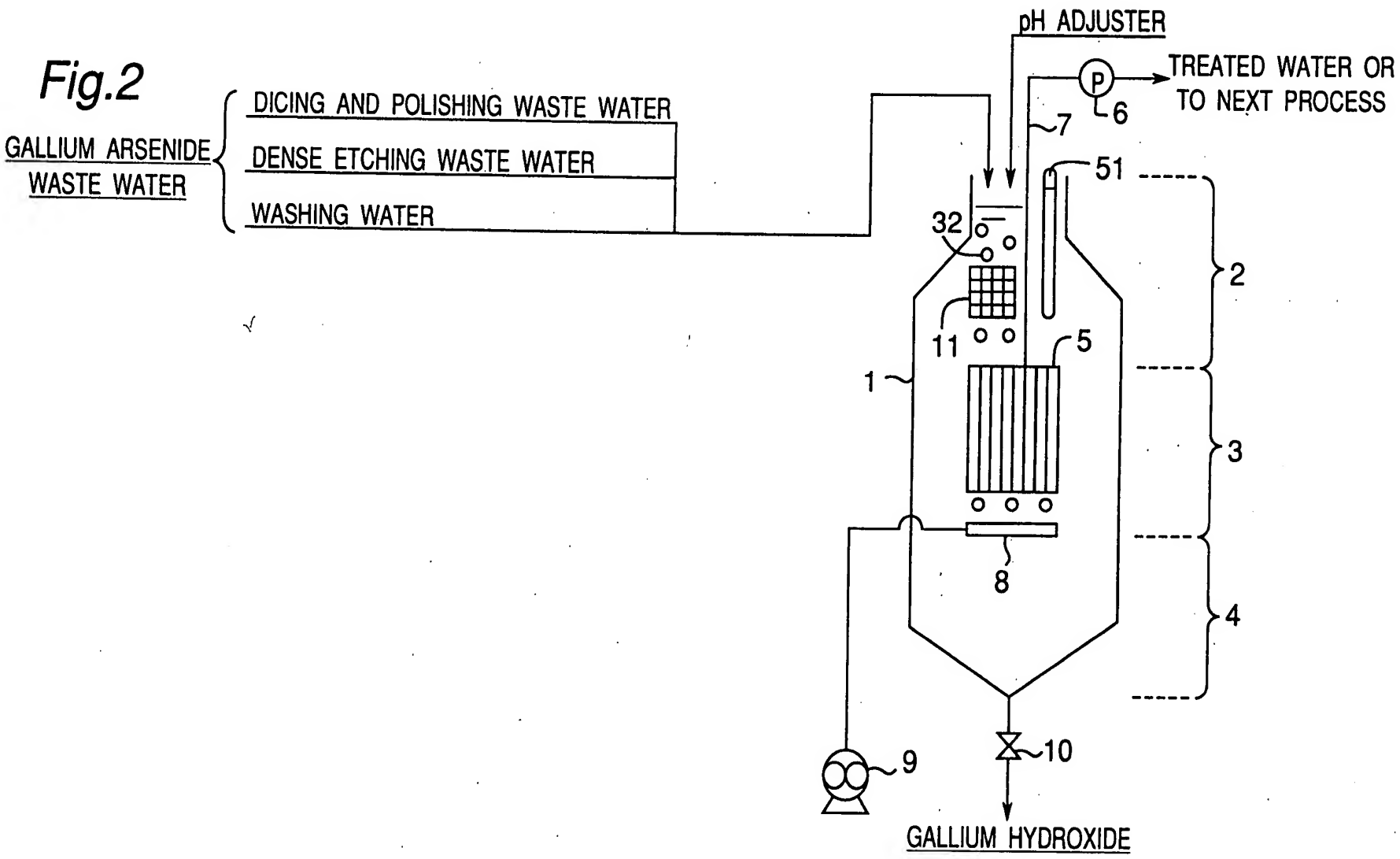

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
P
6
TREATED WATER OR TO NEXT PROCESS
7
51
32
11
5
1
2
3
4
8
9
10
GALLIUM HYDROXIDE

Fig.3

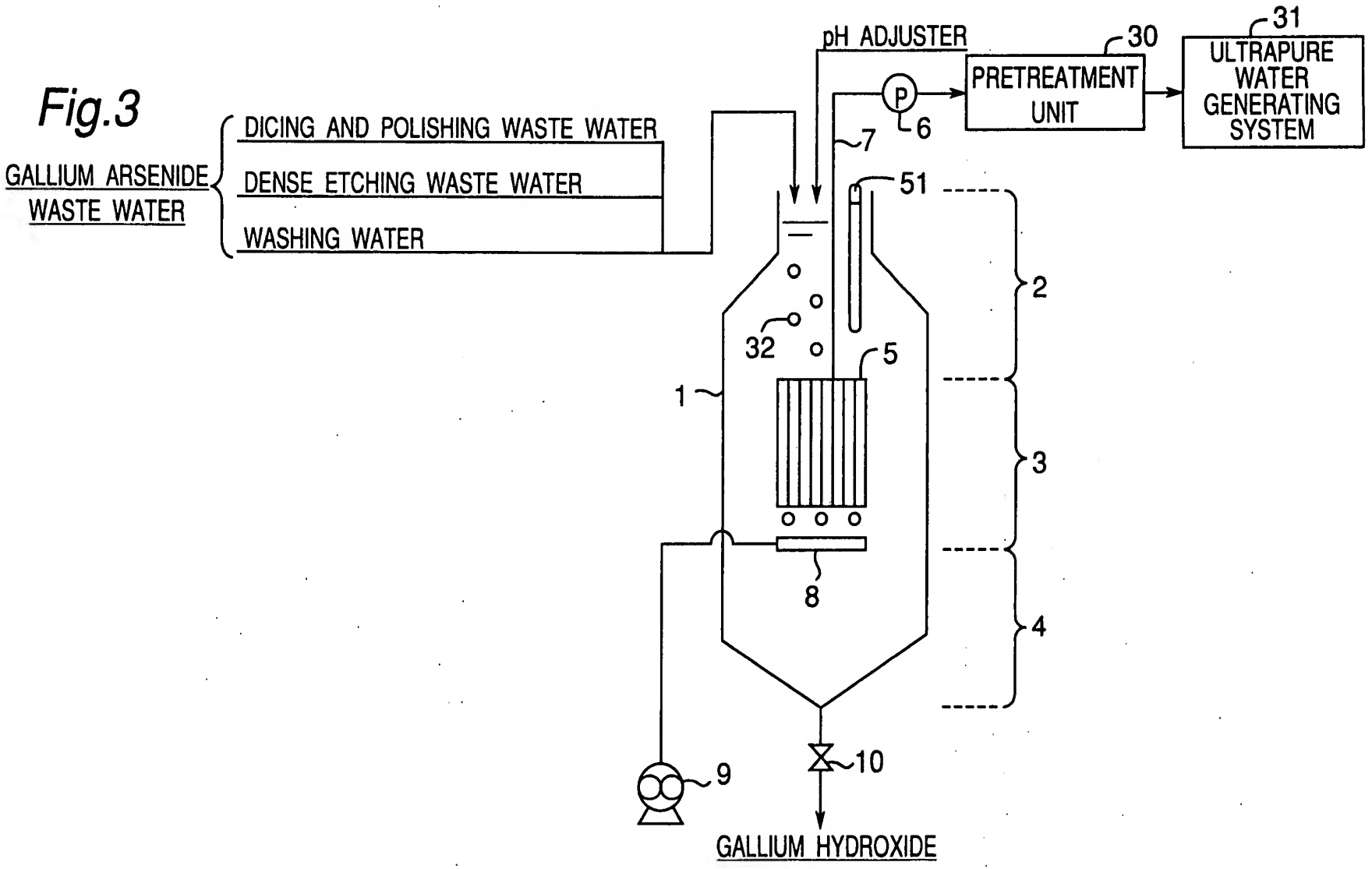

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
P
6
7
30
PRETREATMENT UNIT
31
ULTRAPURE WATER GENERATING SYSTEM
51
2
32
5
1
3
8
4
9
10
GALLIUM HYDROXIDE

Fig.4

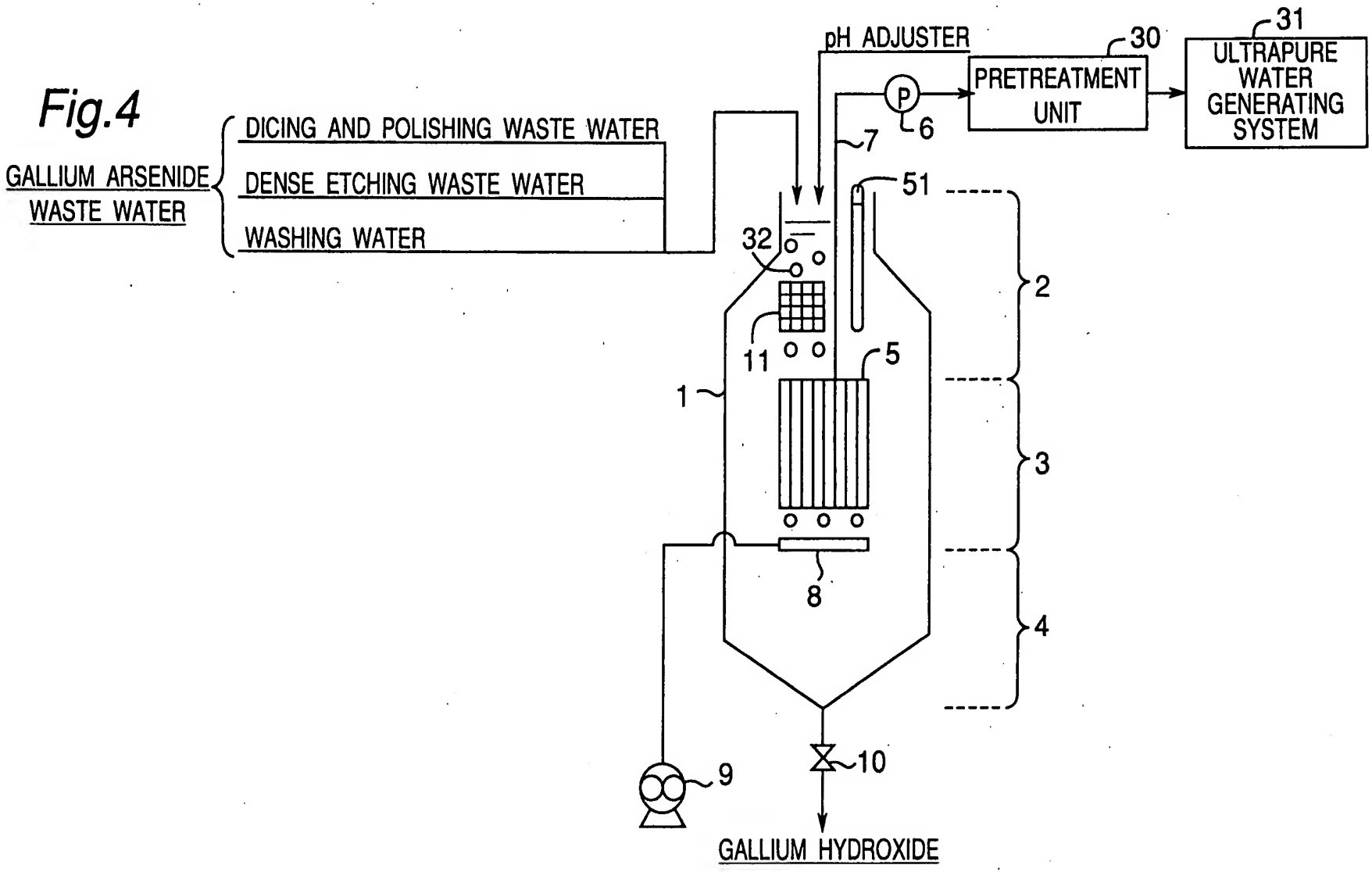

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
P
6
7
30
PRETREATMENT UNIT
31
ULTRAPURE WATER GENERATING SYSTEM
51
32
11
5
1
2
3
4
8
9
10
GALLIUM HYDROXIDE

Fig.5

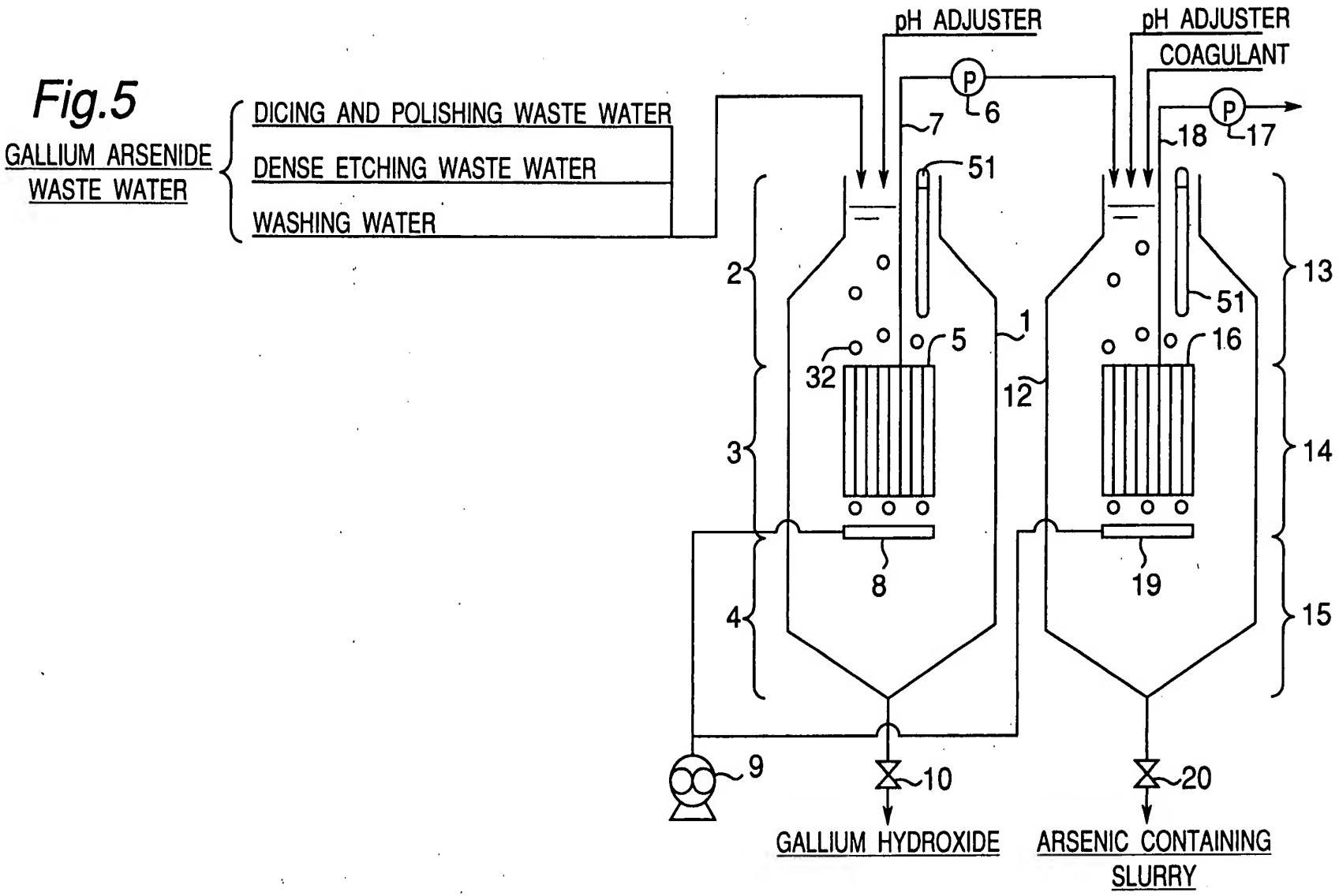

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
P
6
7
18
17
51
51
2
1
13
5
16
32
12
3
14
8
19
4
15
9
10
20
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY

Fig.6

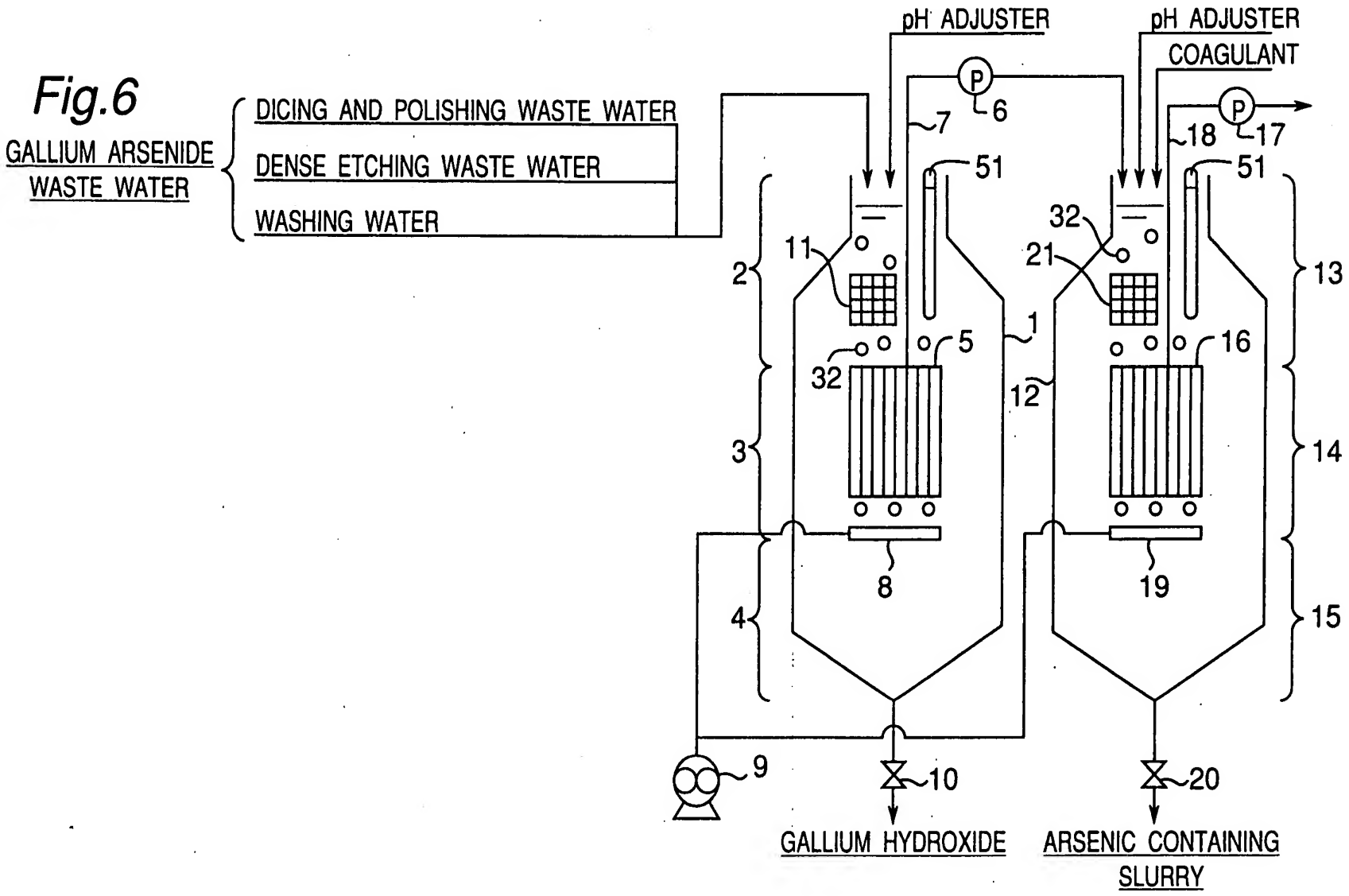

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
P
6
7
18
17
51
51
11
32
21
2
13
1
5
16
32
12
3
14
8
19
4
15
9
10
20
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY

Fig.7

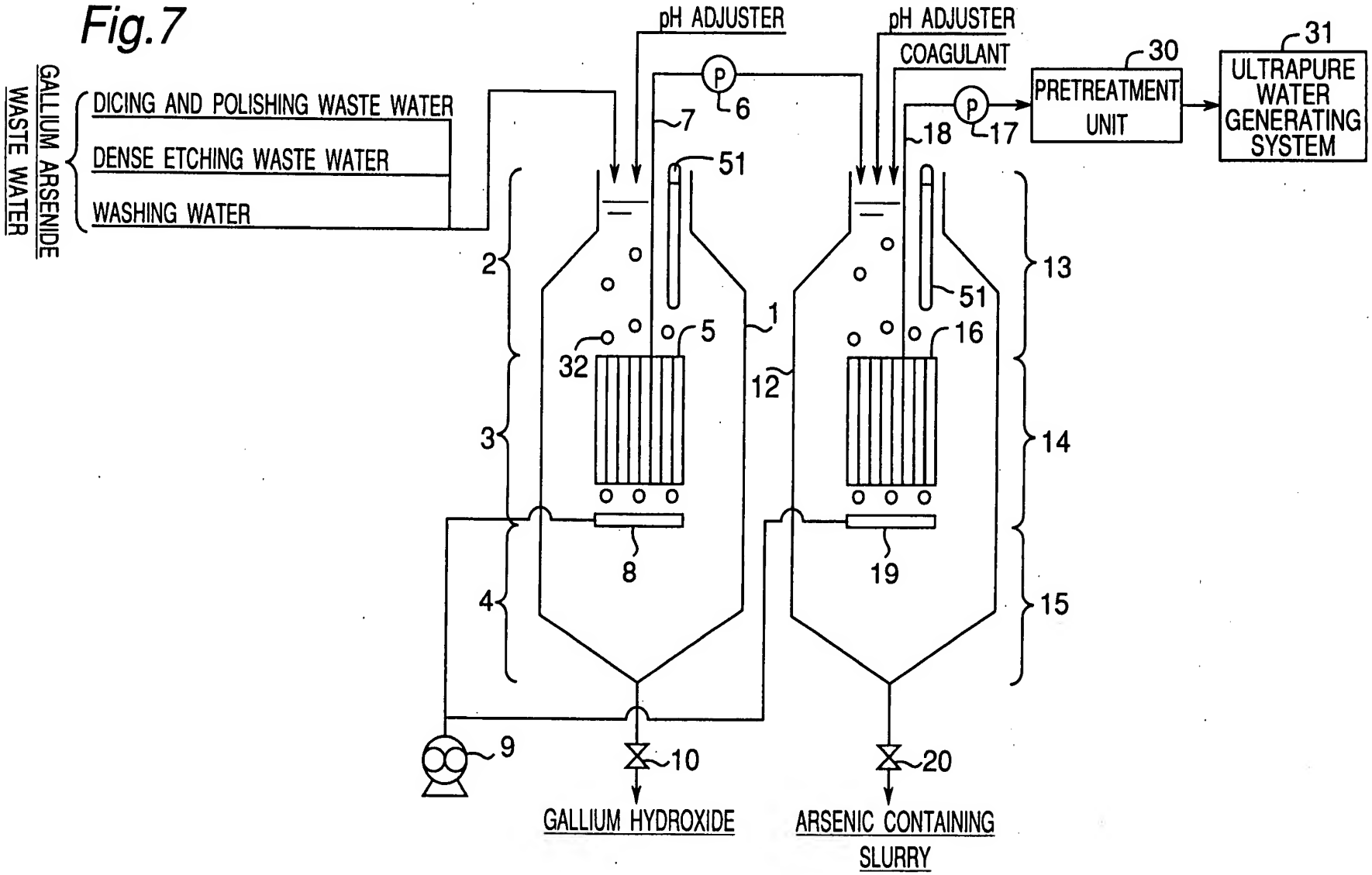

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
P
6
7
51
18
17
30
PRETREATMENT UNIT
31
ULTRAPURE WATER GENERATING SYSTEM
2
3
4
1
12
5
32
16
13
14
15
8
19
9
10
20
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY

Fig.8

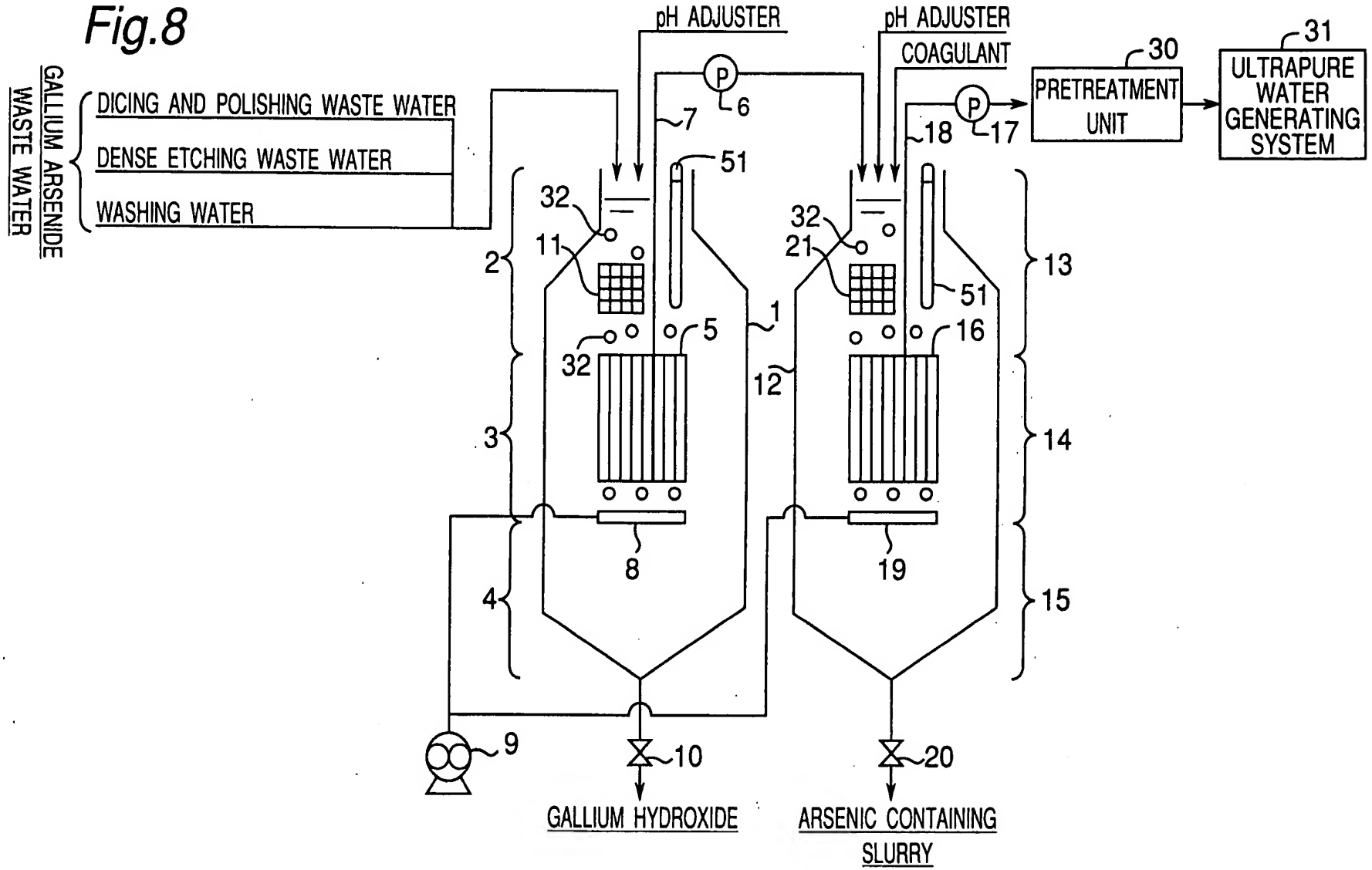

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
P
6
7
P
17
18
30
PRETREATMENT UNIT
31
ULTRAPURE WATER GENERATING SYSTEM
51
32
11
2
1
5
32
3
12
8
4
32
21
51
16
19
13
14
15
9
10
20
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY

Fig.9

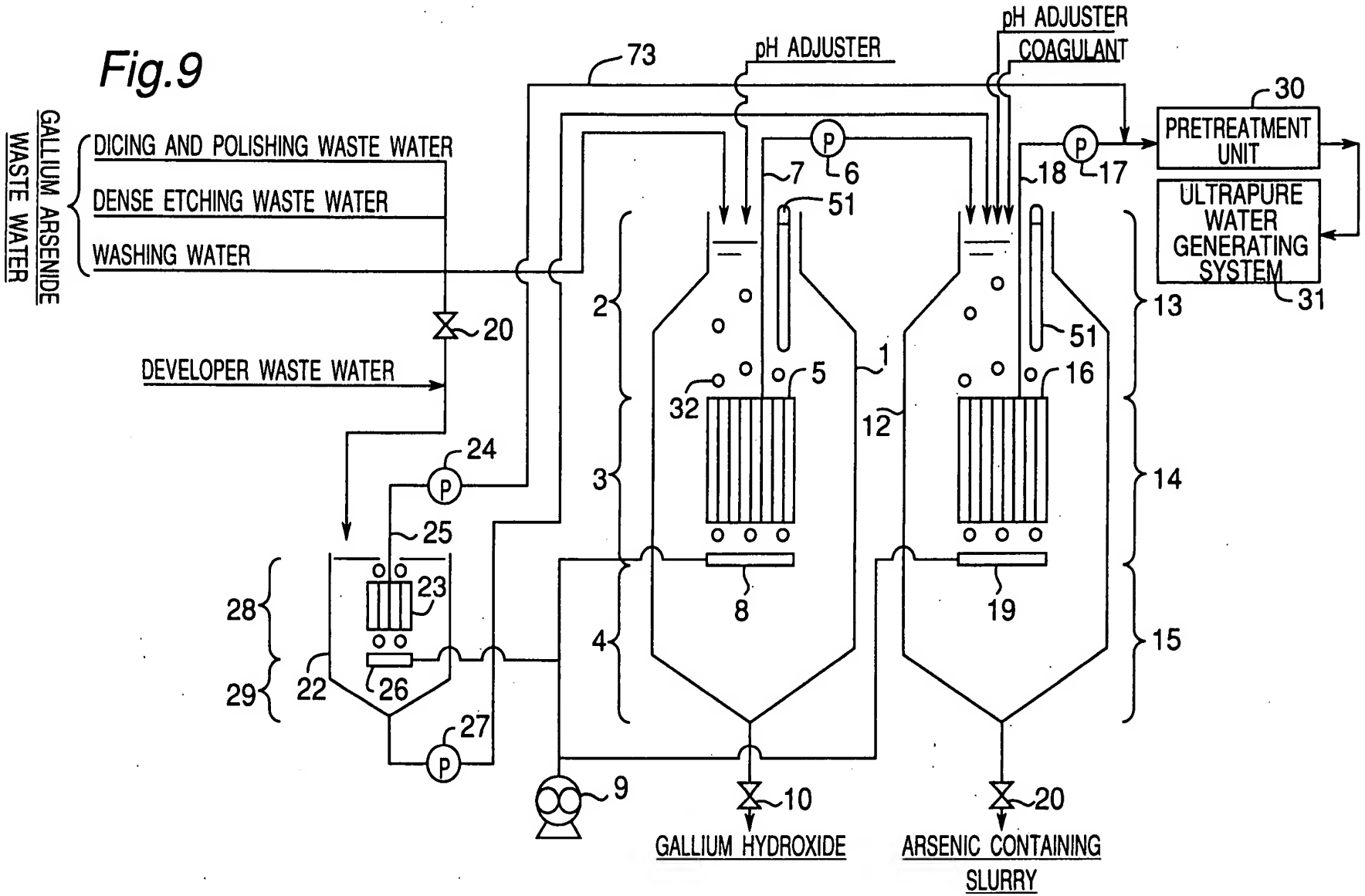
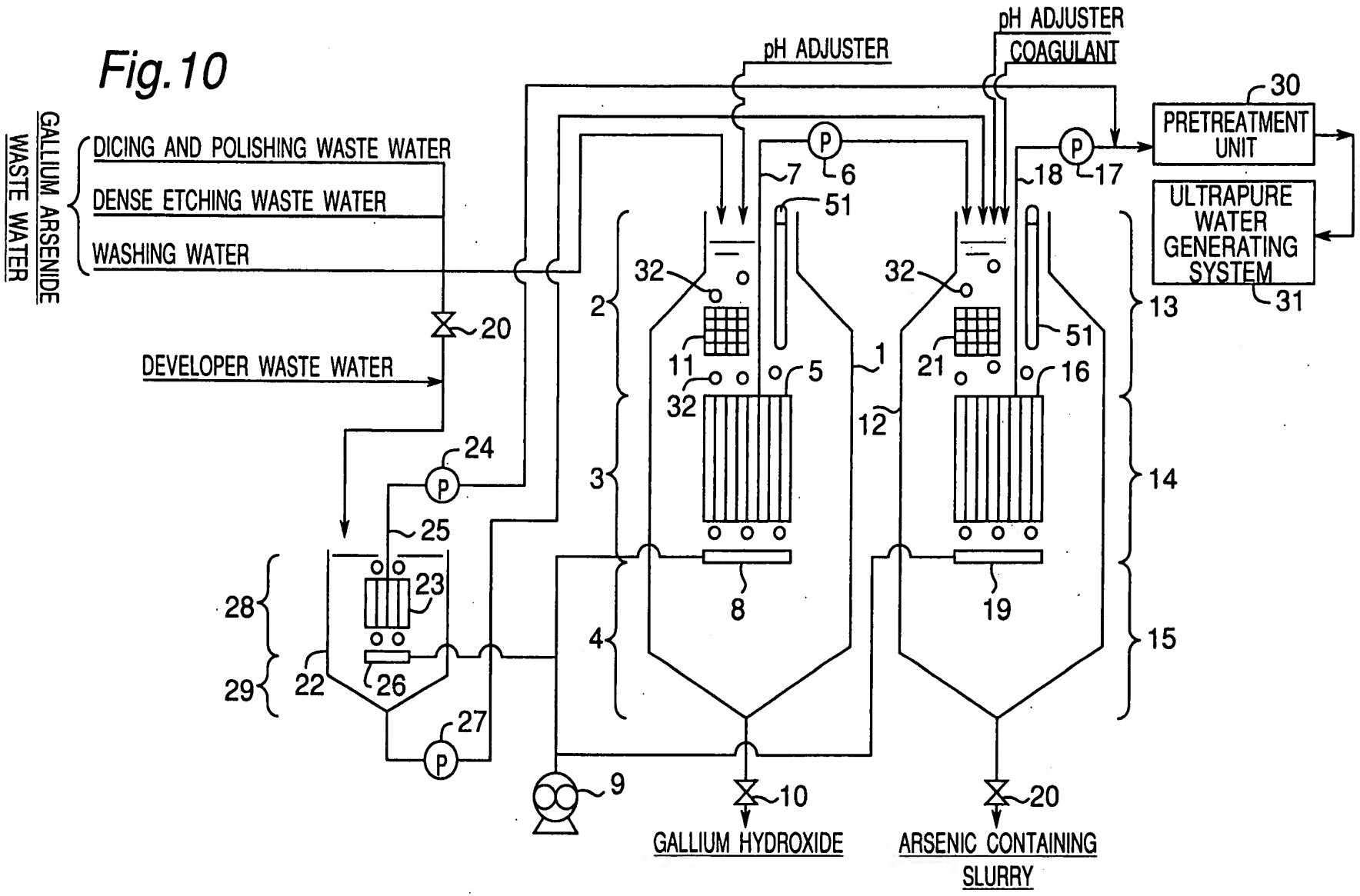

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
PRETREATMENT UNIT
ULTRAPURE WATER GENERATING SYSTEM
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY
73
30
31
P
6
7
17
18
51
20
2
3
4
1
5
32
12
16
13
14
15
24
25
23
28
29
22
26
27
8
19
9
10

Fig.10


GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER COAGULANT
PRETREATMENT UNIT
ULTRAPURE WATER GENERATING SYSTEM
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
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31
32
51

Fig.11

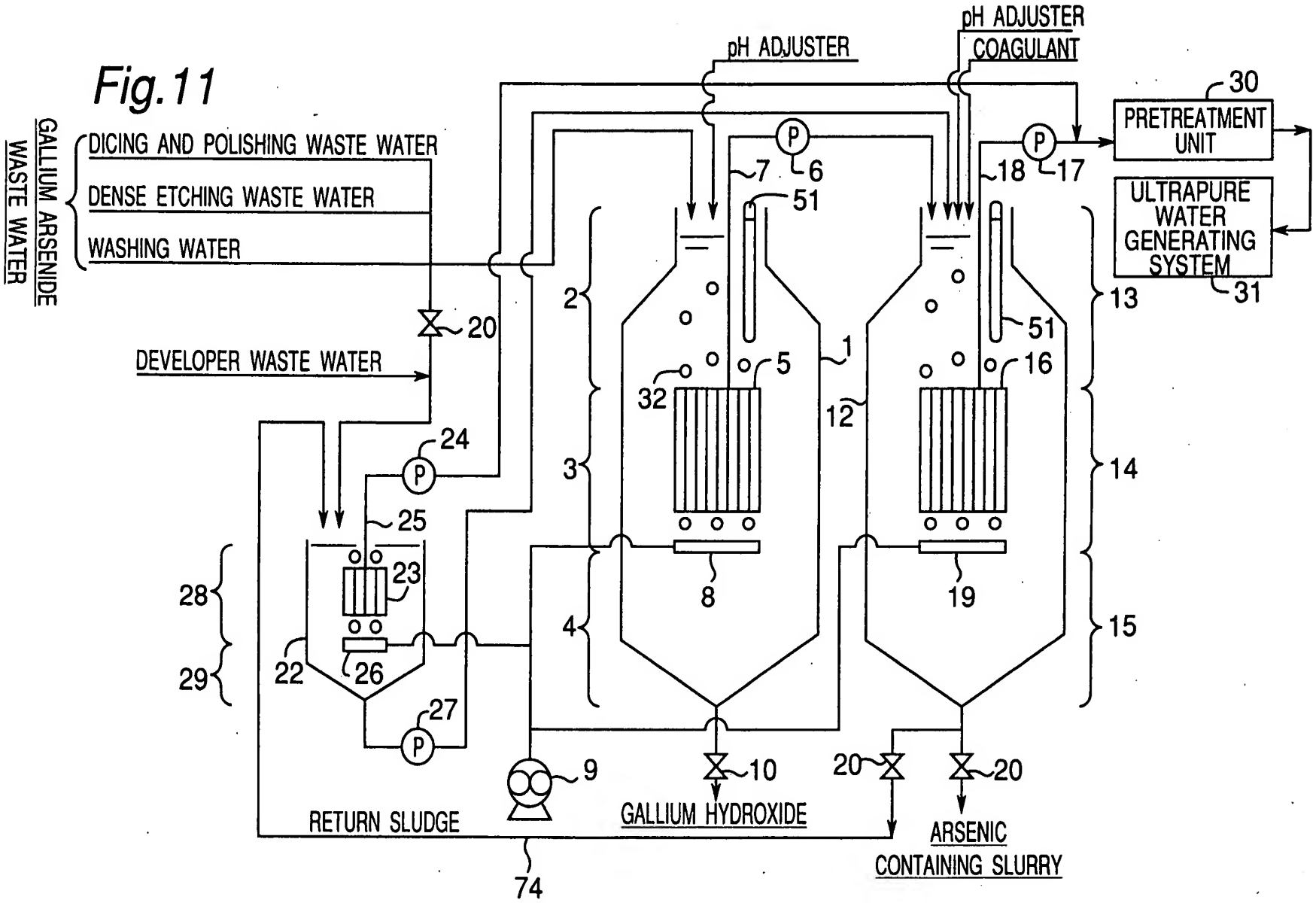
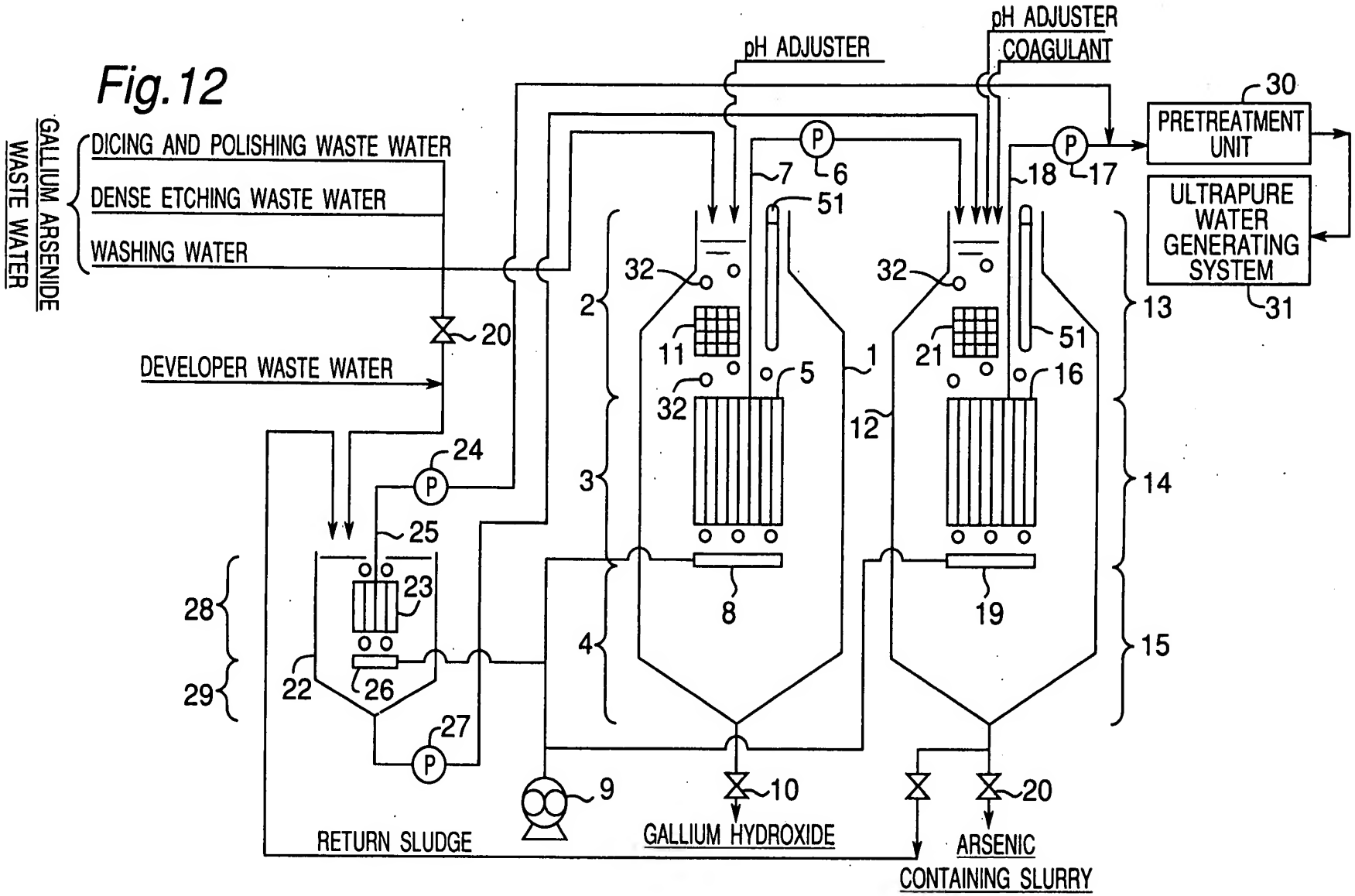

GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
PRETREATMENT UNIT
ULTRAPURE WATER GENERATING SYSTEM
RETURN SLUDGE
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY
1
2
3
4
5
6
7
8
9
10
12
13
14
15
16
17
18
19
20
22
23
24
25
26
27
28
29
30
31
32
51
74

Fig.12


GALLIUM ARSENIDE WASTE WATER
DICING AND POLISHING WASTE WATER
DENSE ETCHING WASTE WATER
WASHING WATER
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER COAGULANT
PRETREATMENT UNIT
ULTRAPURE WATER GENERATING SYSTEM
RETURN SLUDGE
GALLIUM HYDROXIDE
ARSENIC CONTAINING SLURRY
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
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31
32
51

Fig.13A

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE NORMAL CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)														
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.	12 HR.	13 HR.	14 HR.	15 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.											—				
SECOND SUBMERGED MEMBRANE SEPARATION TANK	4 HR.												—	—	—	—
THIRD SUBMERGED MEMBRANE SEPARATION TANK	10 HR.	—	—	—	—	—	—	—	—	—	—					

Fig.13B

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE LOW CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)														
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.	12 HR.	13 HR.	14 HR.	15 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.							—								
SECOND SUBMERGED MEMBRANE SEPARATION TANK	2 HR.								—	—						
THIRD SUBMERGED MEMBRANE SEPARATION TANK	6 HR.	—	—	—	—	—	—									

Fig.14

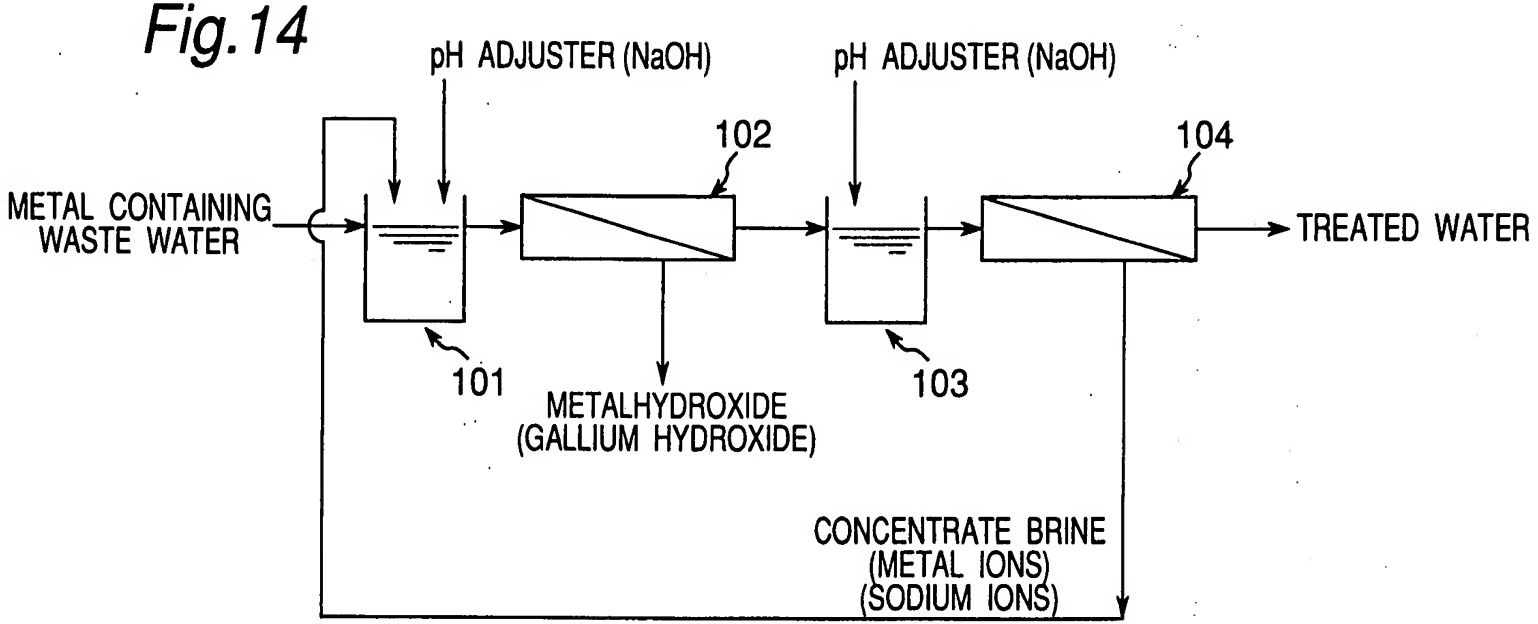

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
102
104
METAL CONTAINING
WASTE WATER
TREATED WATER
101
103
METALHYDROXIDE
(GALLIUM HYDROXIDE)
CONCENTRATE BRINE
(METAL IONS)
(SODIUM IONS)

Fig.15

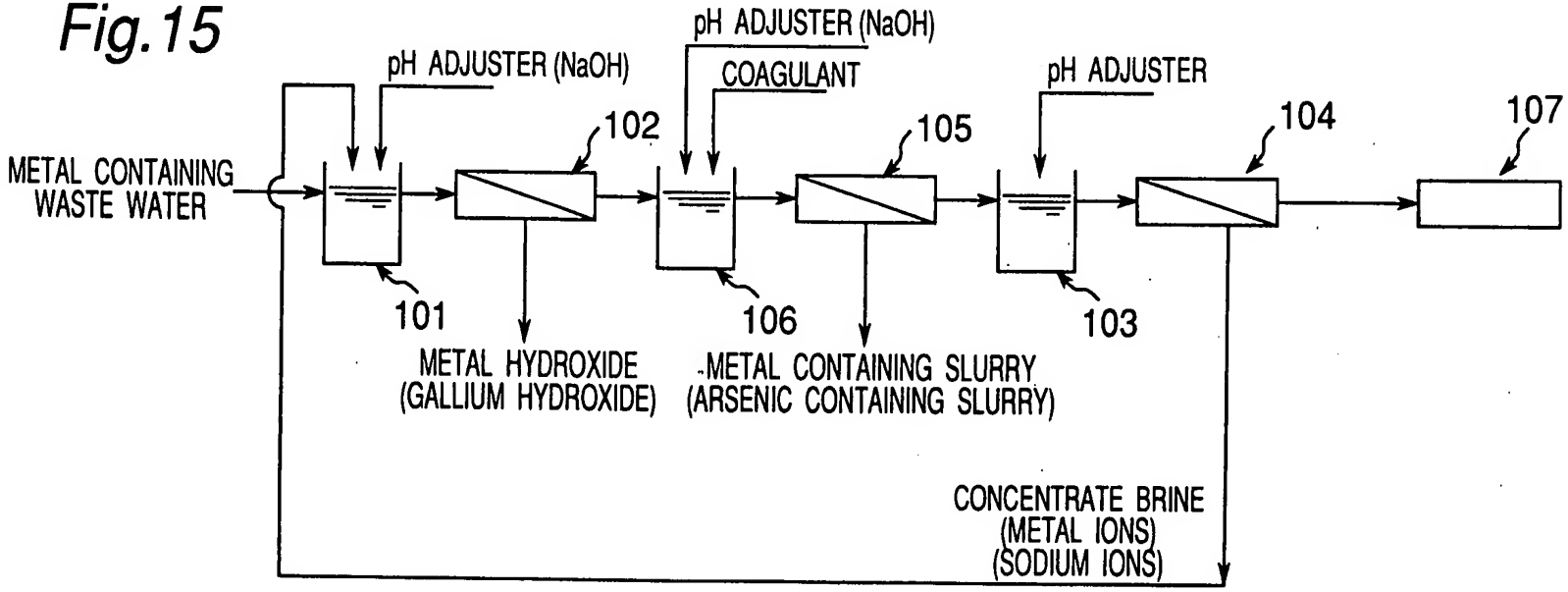

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
METAL CONTAINING WASTE WATER
102
105
104
107
101
106
103
METAL HYDROXIDE (GALLIUM HYDROXIDE)
METAL CONTAINING SLURRY (ARSENIC CONTAINING SLURRY)
CONCENTRATE BRINE (METAL IONS) (SODIUM IONS)

Fig.16

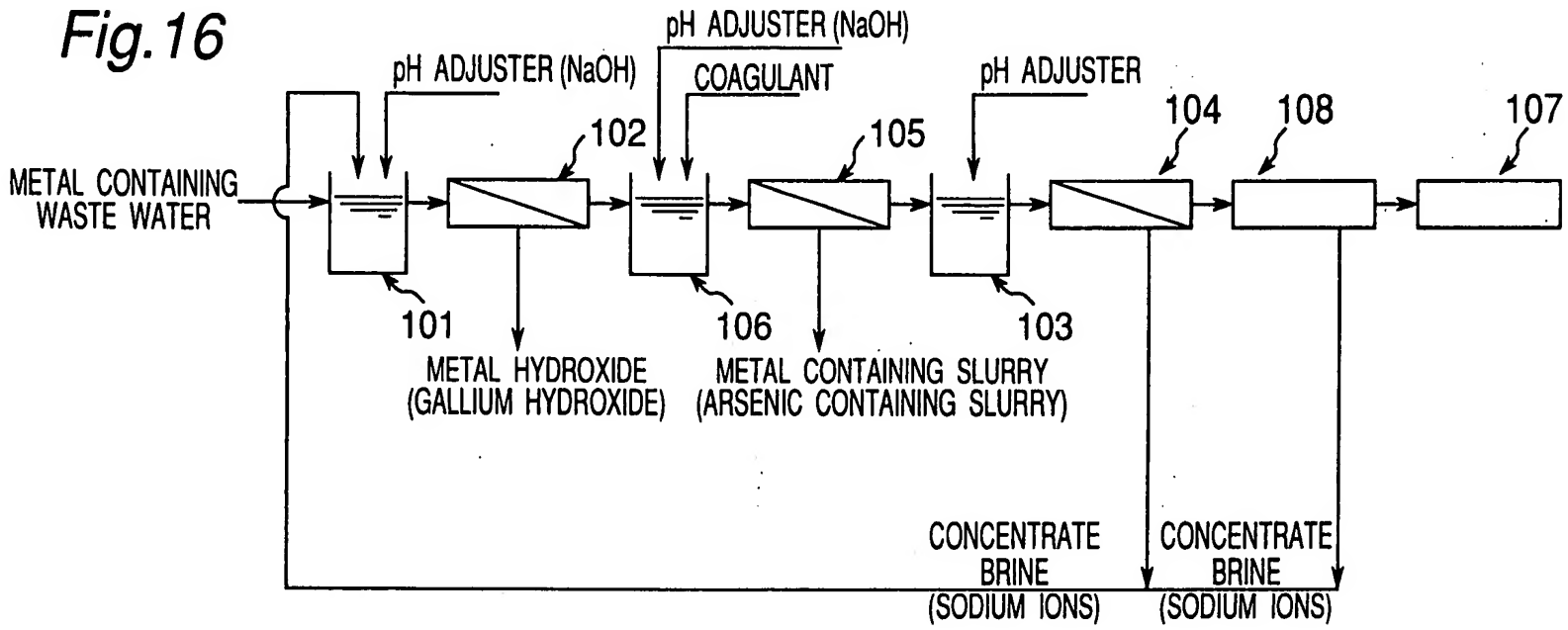

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
METAL CONTAINING WASTE WATER
102
105
104
108
107
101
106
103
METAL HYDROXIDE (GALLIUM HYDROXIDE)
METAL CONTAINING SLURRY (ARSENIC CONTAINING SLURRY)
CONCENTRATE BRINE (SODIUM IONS)
CONCENTRATE BRINE (SODIUM IONS)

Fig.17

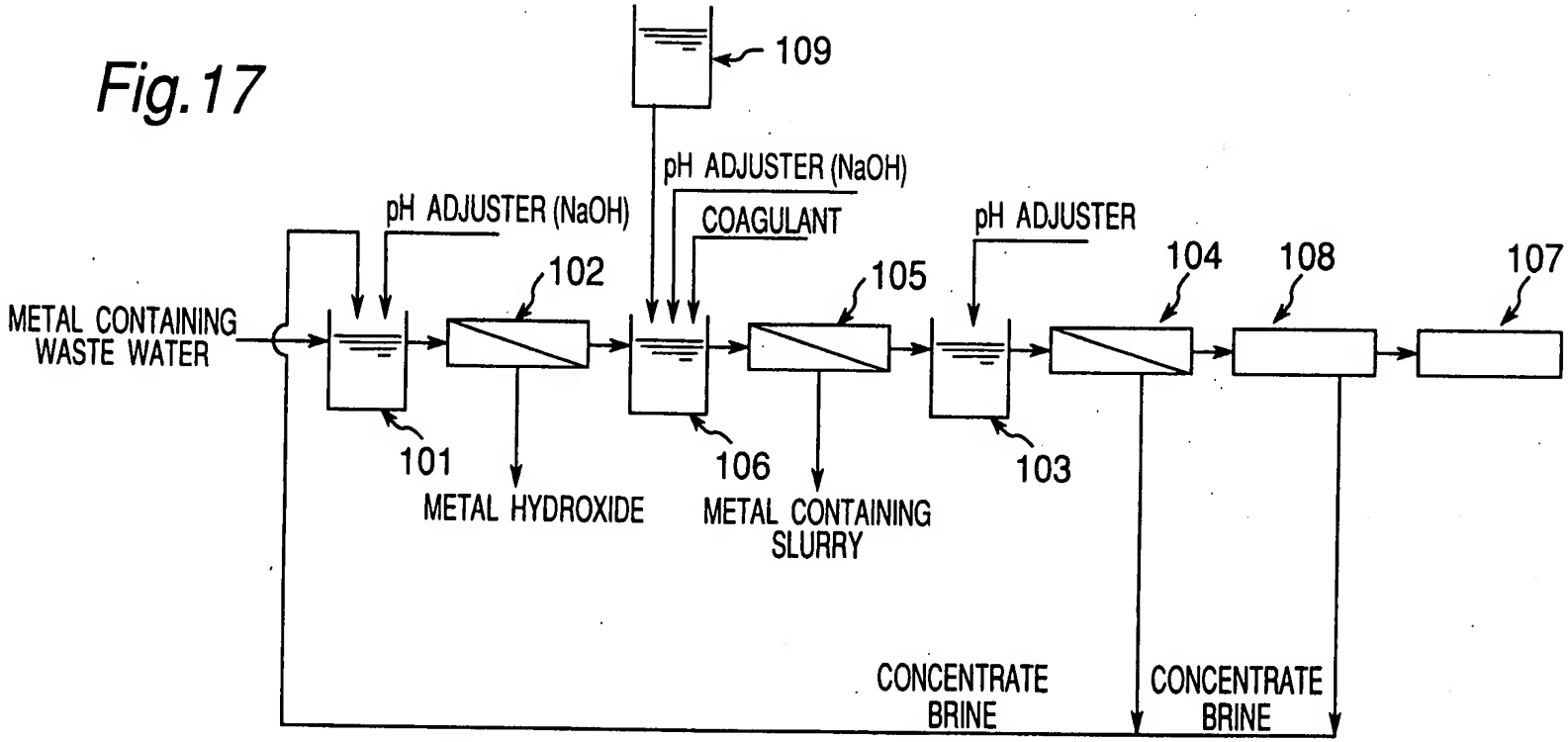

109
pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
102
105
104
108
107
METAL CONTAINING WASTE WATER
101
106
103
METAL HYDROXIDE
METAL CONTAINING SLURRY
CONCENTRATE BRINE
CONCENTRATE BRINE

Fig. 18

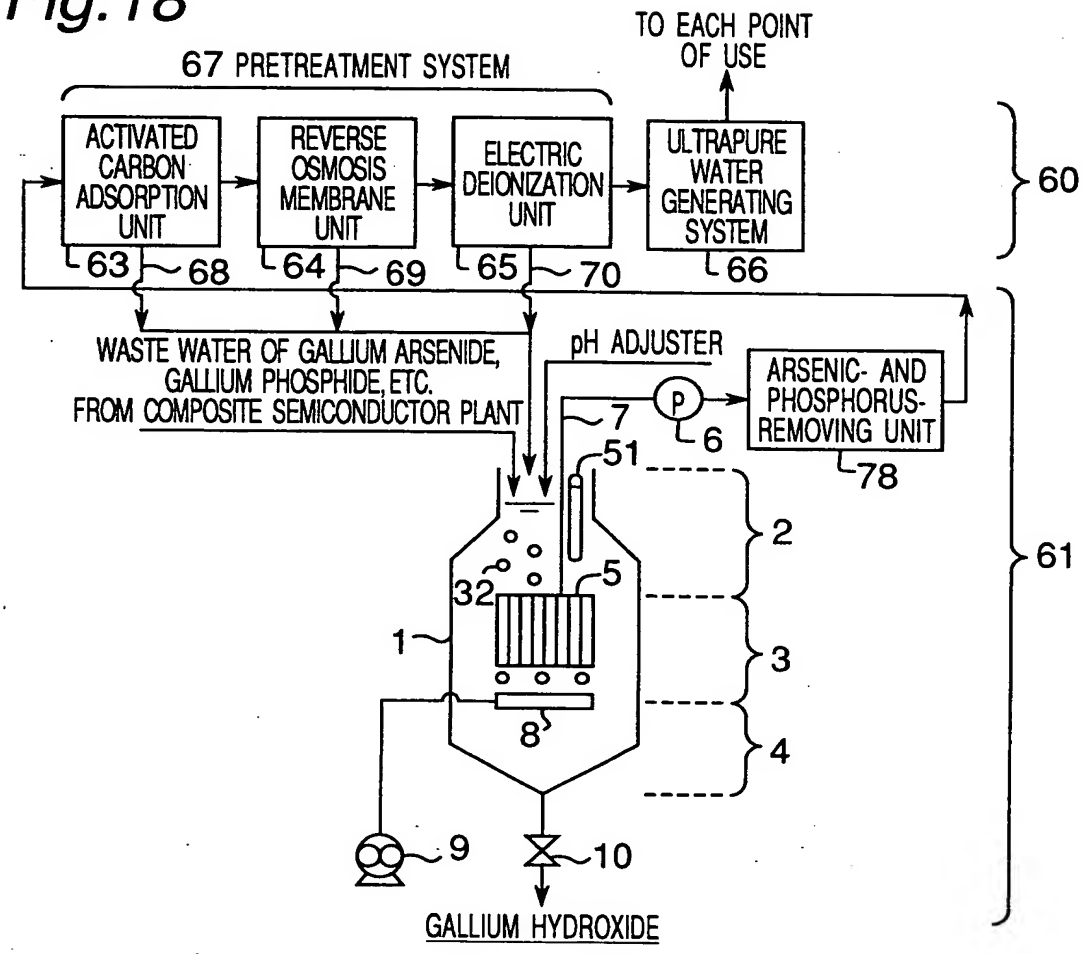

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
P
6
7
ARSENIC- AND PHOSPHORUS-REMOVING UNIT
78
51
2
32
5
1
3
8
4
9
10
61
GALLIUM HYDROXIDE

Fig.19

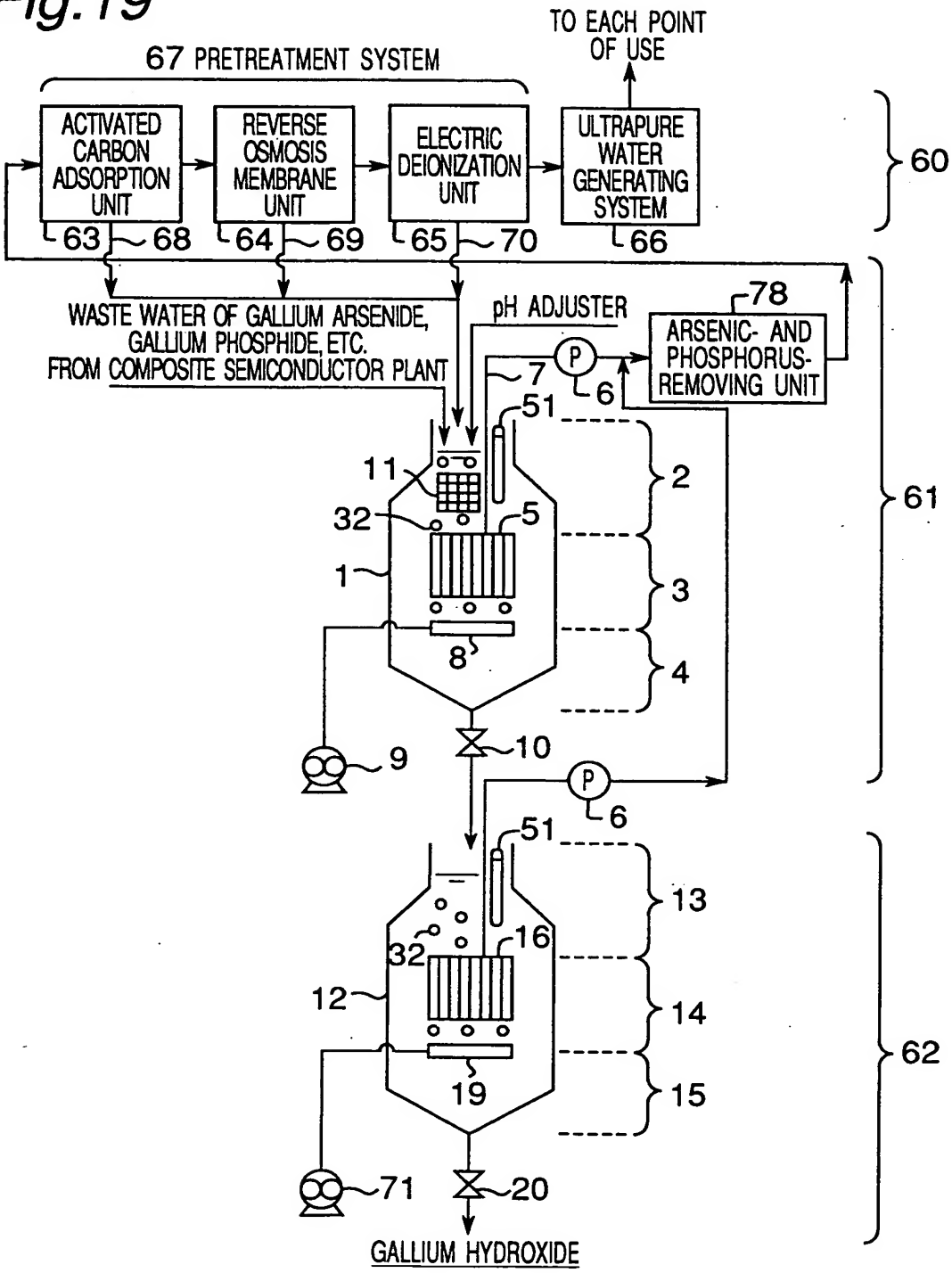

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
78
ARSENIC- AND PHOSPHORUS-REMOVING UNIT
P
7
6
51
11
2
32
5
1
3
8
4
61
9
10
P
6
51
13
32
16
12
14
19
15
62
71
20
GALLIUM HYDROXIDE

Fig.20

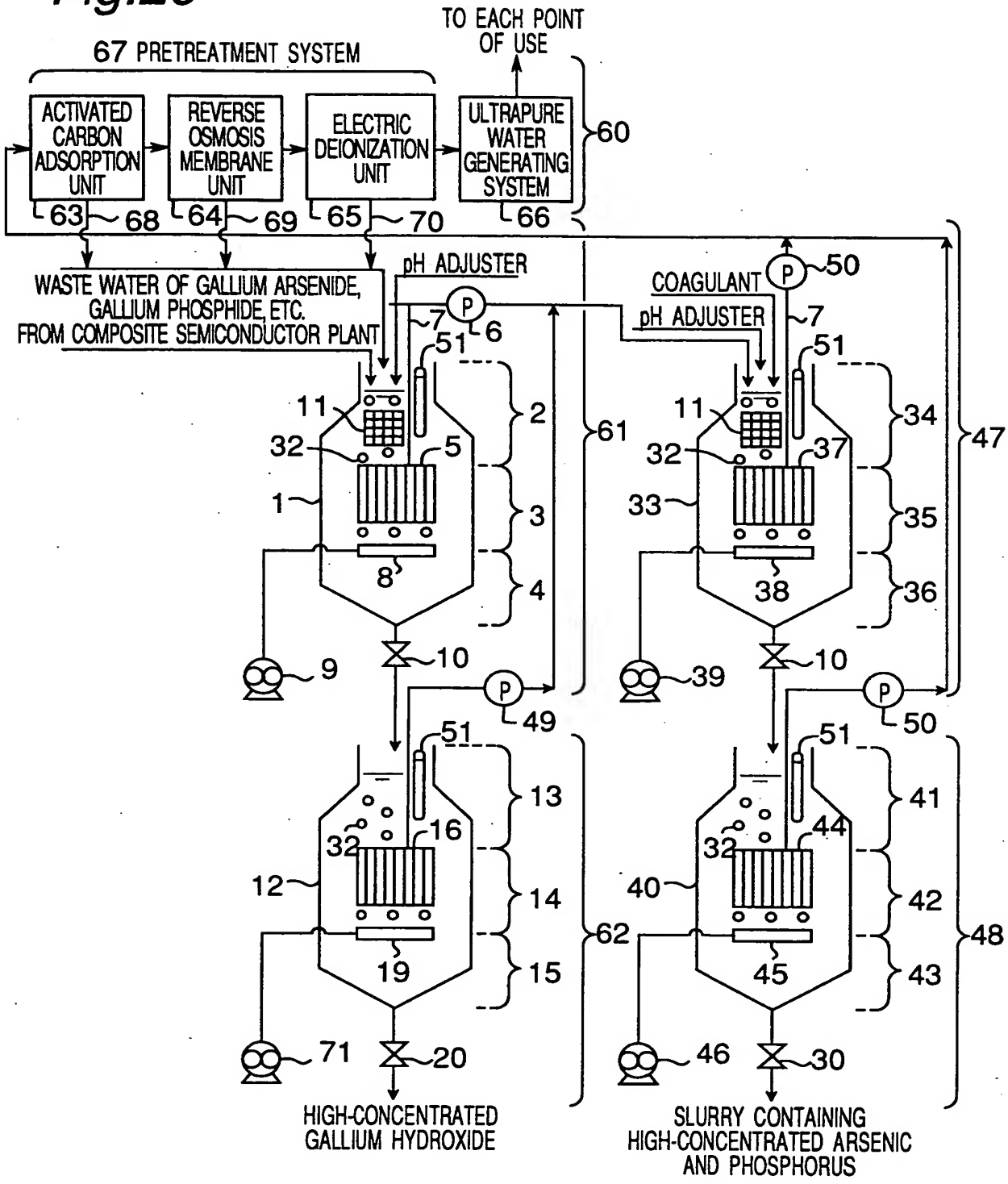

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER
P
50
7
6
51
11
32
5
1
8
2
3
4
61
9
10
49
13
16
12
19
14
15
62
71
20
HIGH-CONCENTRATED GALLIUM HYDROXIDE
34
37
33
38
35
36
47
39
41
44
40
45
42
43
48
46
30
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.21

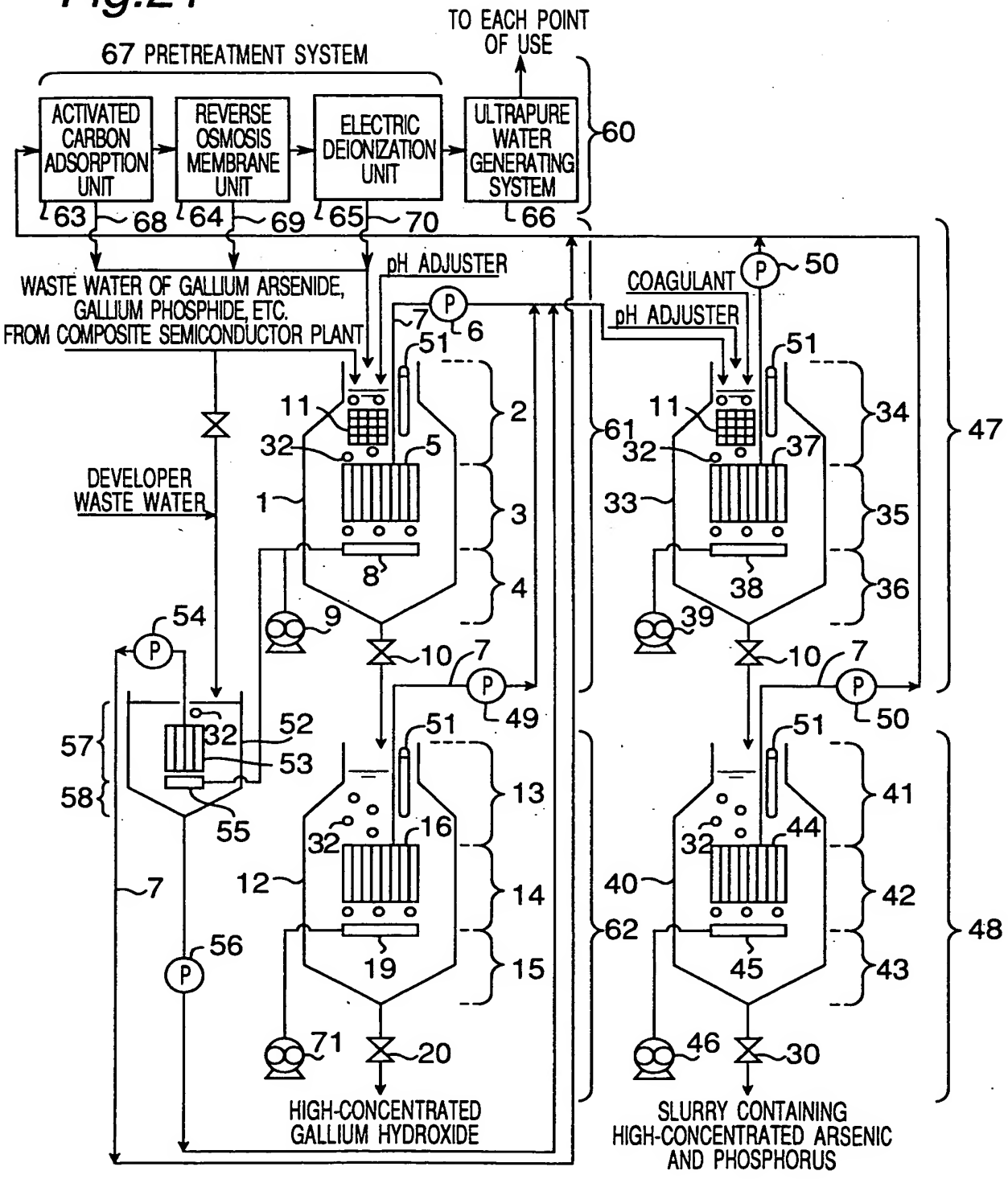

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER
DEVELOPER WASTE WATER
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.22

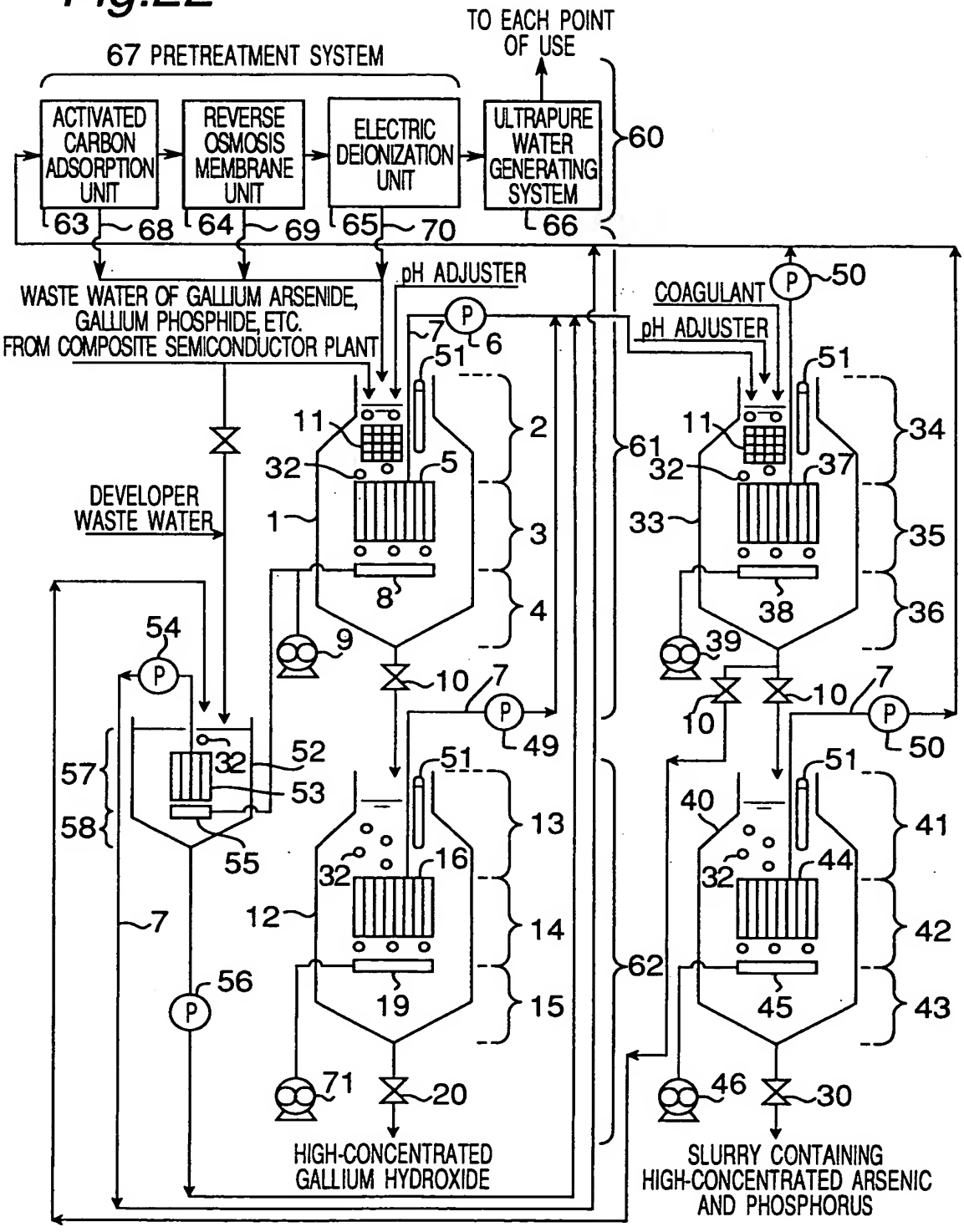

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER
DEVELOPER WASTE WATER
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.23

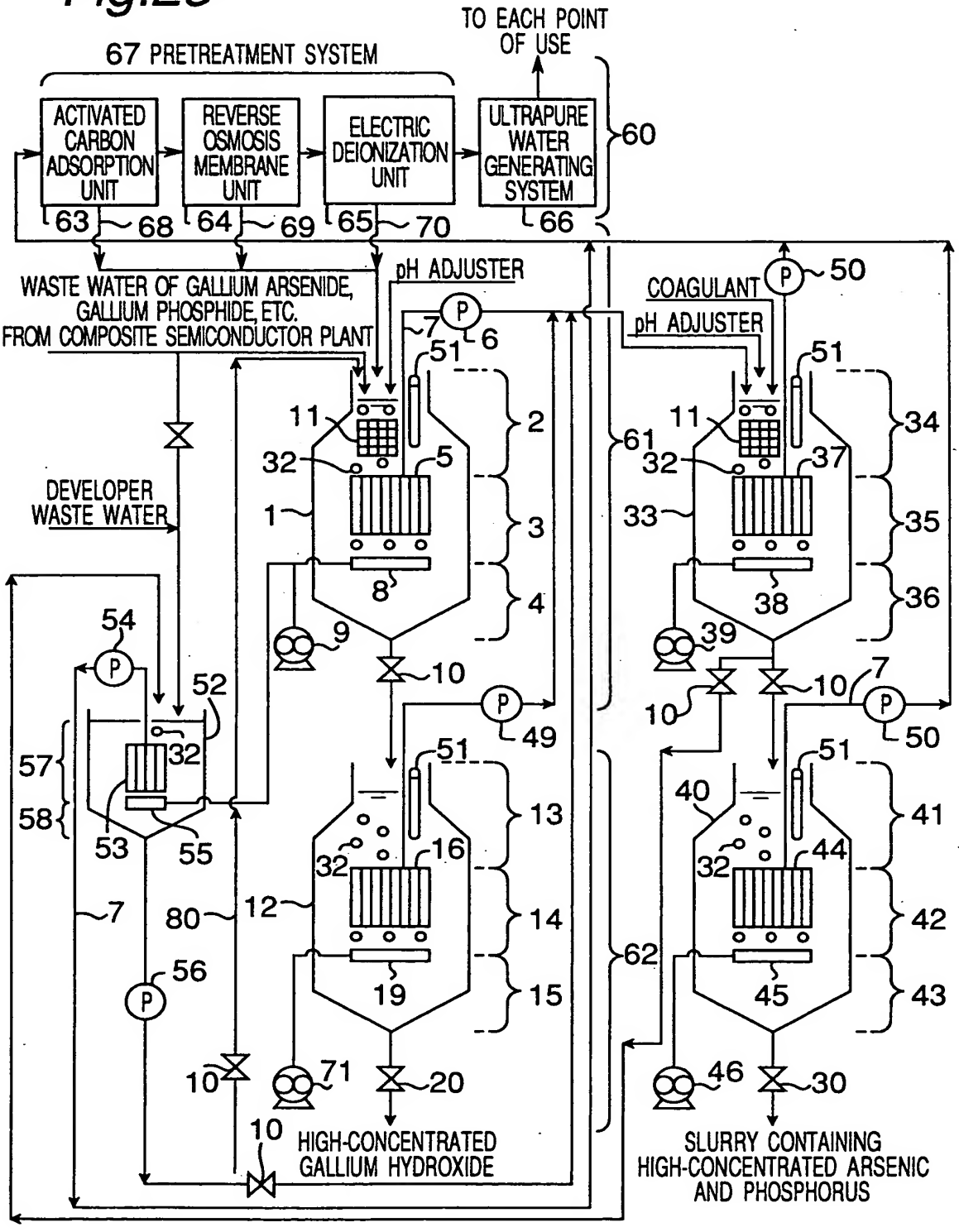

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER
DEVELOPER WASTE WATER
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.24

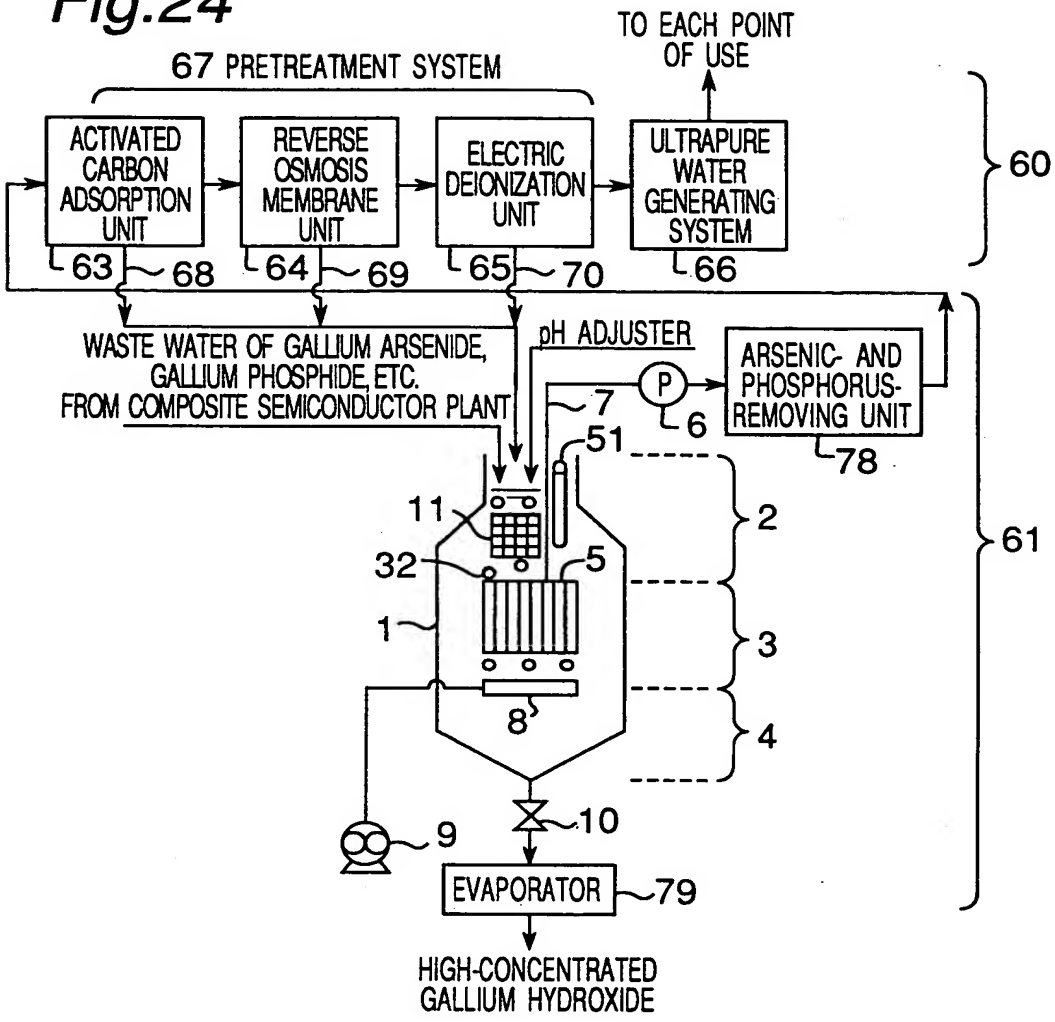

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
P
6
7
ARSENIC- AND PHOSPHORUS-REMOVING UNIT
78
51
11
2
32
5
61
1
3
8
4
9
10
EVAPORATOR
79
HIGH-CONCENTRATED GALLIUM HYDROXIDE

Fig.25

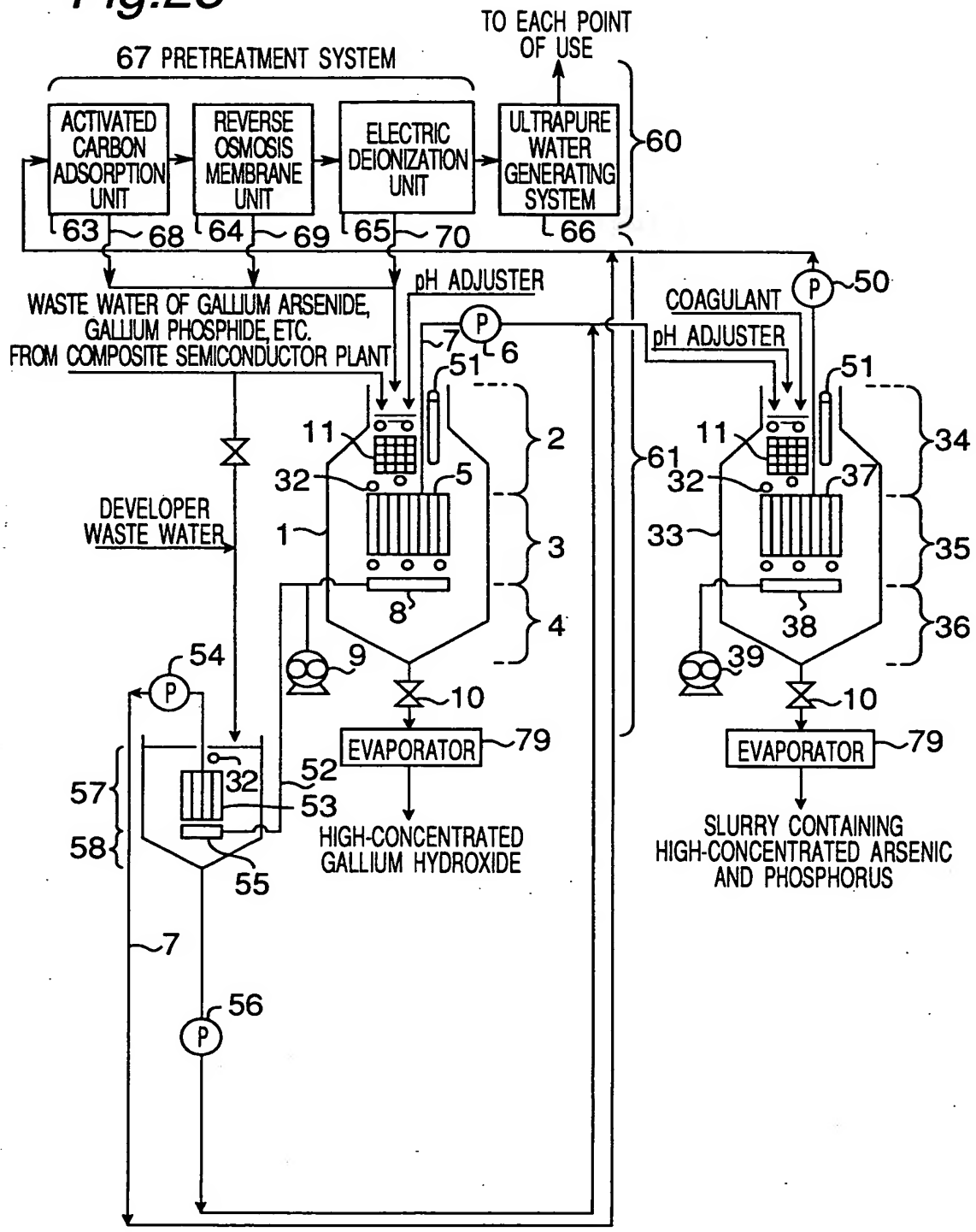

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER
P
50
7
6
51
11
2
32
5
1
3
8
4
DEVELOPER WASTE WATER
9
10
EVAPORATOR
79
HIGH-CONCENTRATED GALLIUM HYDROXIDE
61
34
37
33
35
38
36
39
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS
54
57
58
52
53
55
56

Fig.26

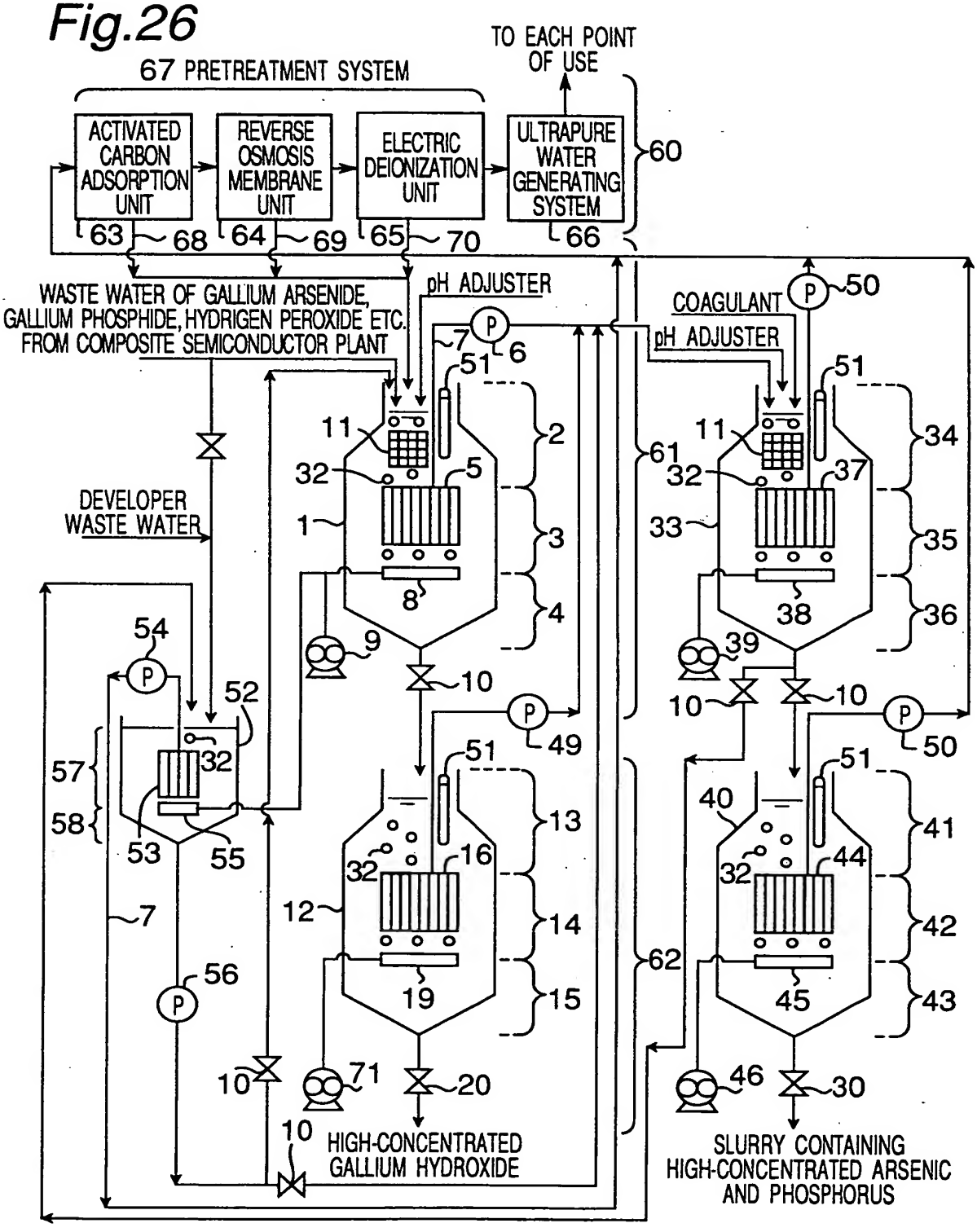

TO EACH POINT OF USE
67 PRETREATMENT SYSTEM
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
60
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, HYDRIGEN PEROXIDE ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER
DEVELOPER WASTE WATER
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.27A

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE NORMAL CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)														
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.	12 HR.	13 HR.	14 HR.	15 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.															
SECOND SUBMERGED MEMBRANE SEPARATION TANK	2 HR.															
THIRD SUBMERGED MEMBRANE SEPARATION TANK	4 HR.															
FOURTH SUBMERGED MEMBRANE SEPARATION TANK	4 HR.															

Fig.27B

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE LOW CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)														
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.	12 HR.	13 HR.	14 HR.	15 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.															
SECOND SUBMERGED MEMBRANE SEPARATION TANK	2 HR.															
THIRD SUBMERGED MEMBRANE SEPARATION TANK	3 HR.															
FOURTH SUBMERGED MEMBRANE SEPARATION TANK	3 HR.															

Fig.28A

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE NORMAL CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)										
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.
SUBMERGED MEMBRANE SEPARATION TANK	2 HR.											
SECOND SUBMERGED MEMBRANE SEPARATION TANK	4 HR.											

Fig.28B

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE LOW CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)										
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.											
SECOND SUBMERGED MEMBRANE SEPARATION TANK	2 HR.											

Fig.29

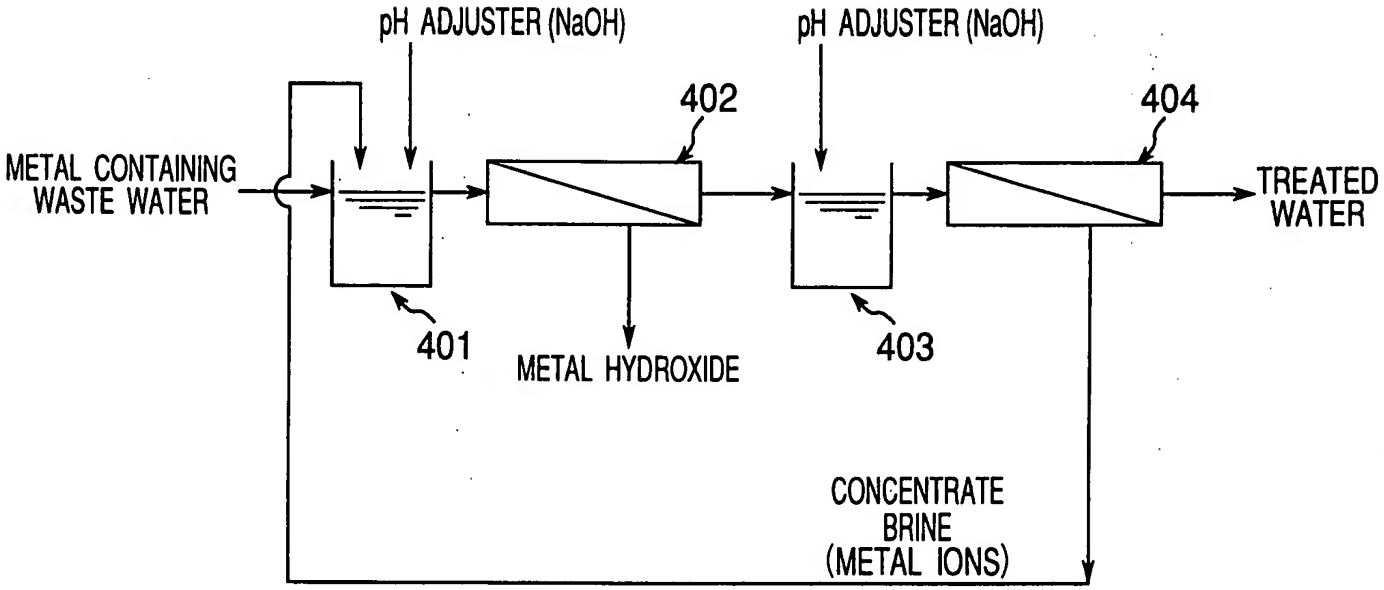

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
402
404
METAL CONTAINING WASTE WATER
TREATED WATER
401
METAL HYDROXIDE
403
CONCENTRATE BRINE (METAL IONS)

Fig.30

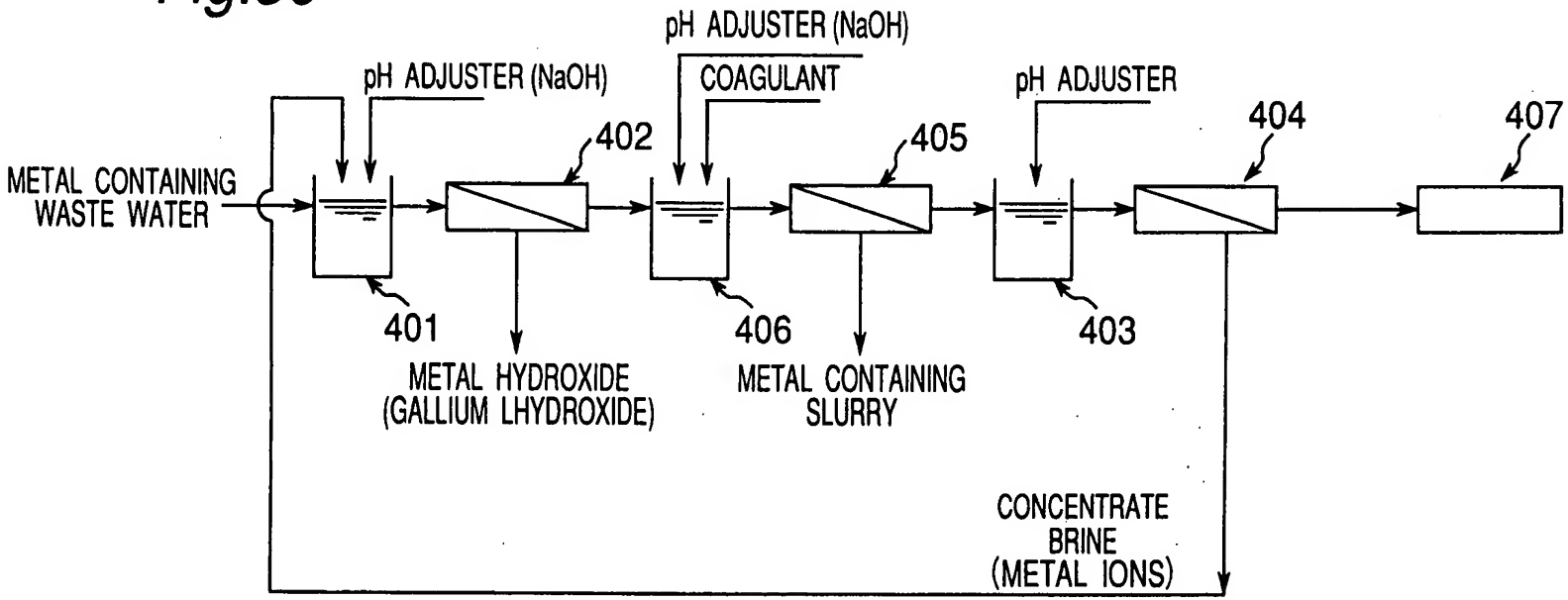

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
METAL CONTAINING WASTE WATER
402
405
404
407
401
406
403
METAL HYDROXIDE (GALLIUM LHYDROXIDE)
METAL CONTAINING SLURRY
CONCENTRATE BRINE (METAL IONS)

Fig.31

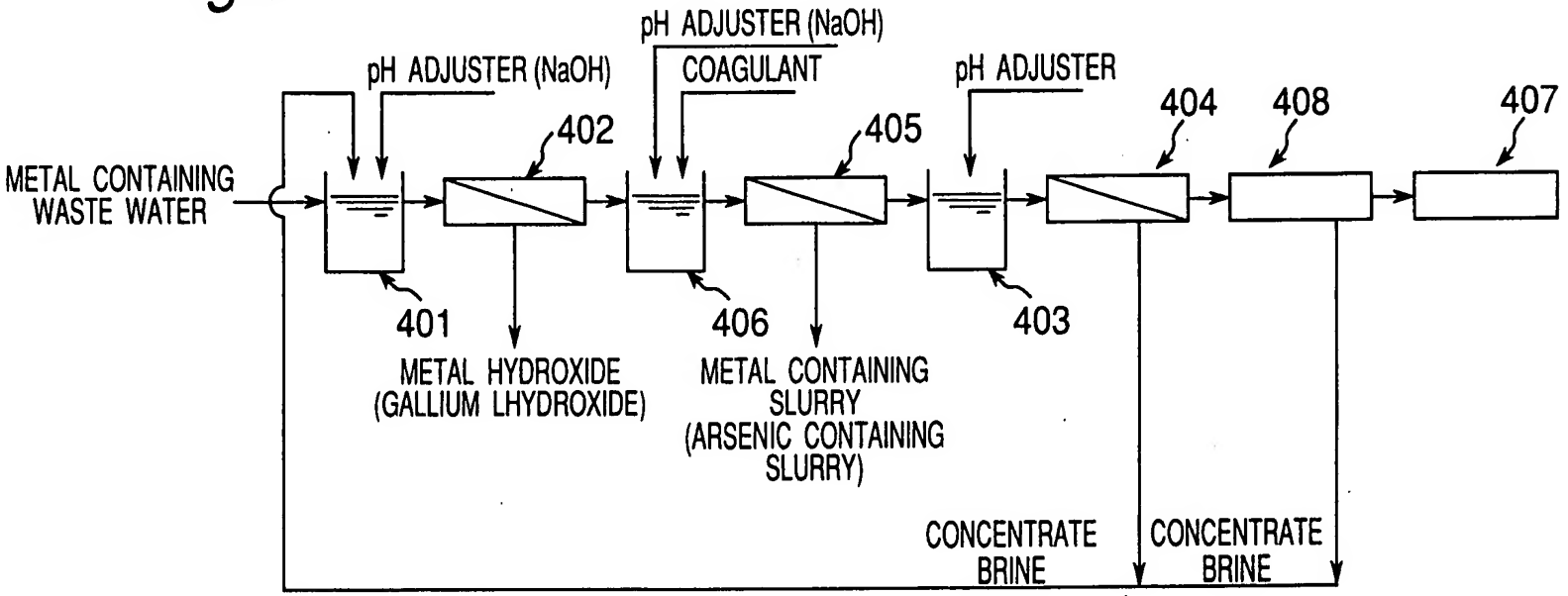

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
404
408
407
402
405
METAL CONTAINING WASTE WATER
401
406
403
METAL HYDROXIDE (GALLIUM LHYDROXIDE)
METAL CONTAINING SLURRY (ARSENIC CONTAINING SLURRY)
CONCENTRATE BRINE
CONCENTRATE BRINE

Fig.32

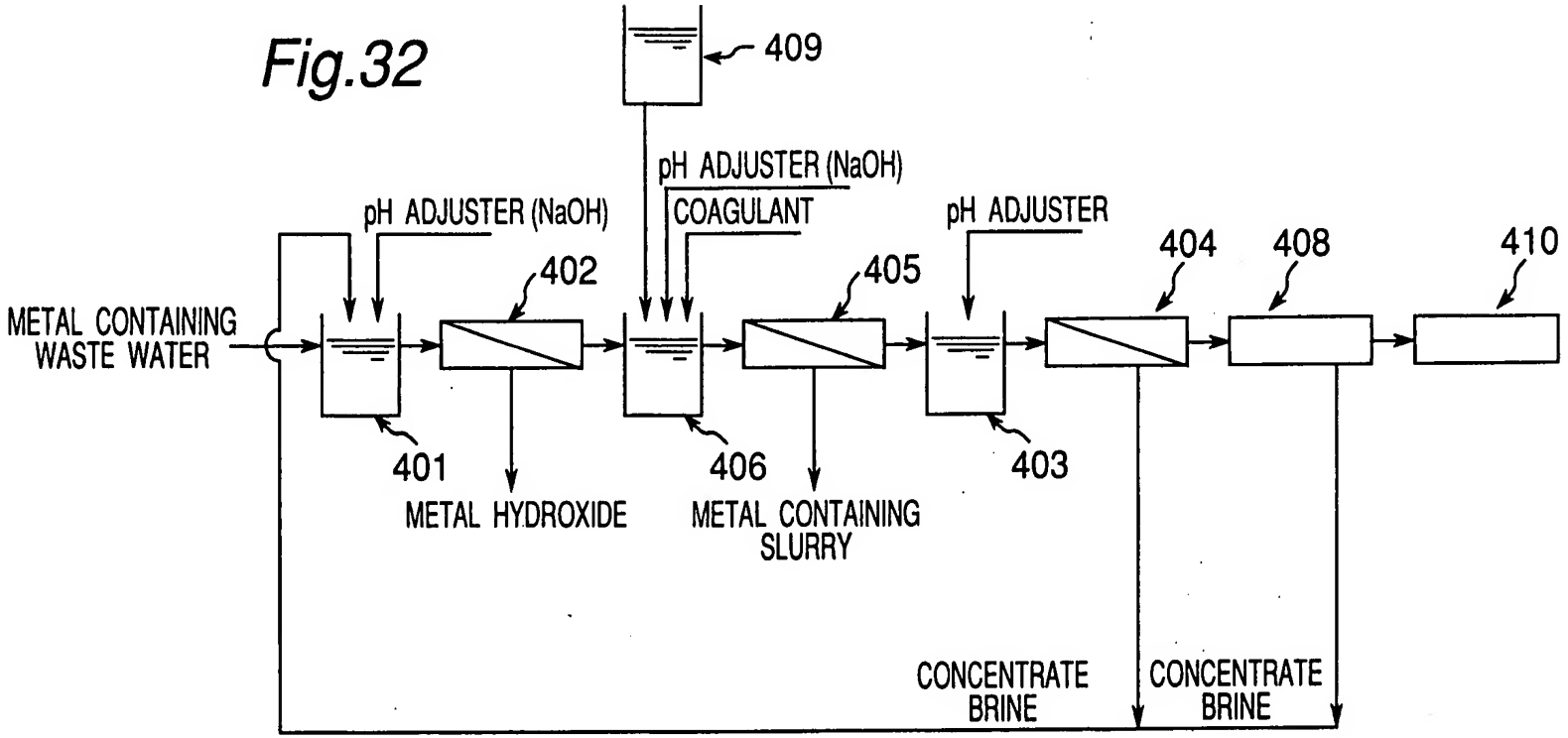

409
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER (NaOH)
pH ADJUSTER
404
408
410
402
405
METAL CONTAINING
WASTE WATER
401
406
403
METAL HYDROXIDE
METAL CONTAINING
SLURRY
CONCENTRATE
BRINE
CONCENTRATE
BRINE

Fig.33

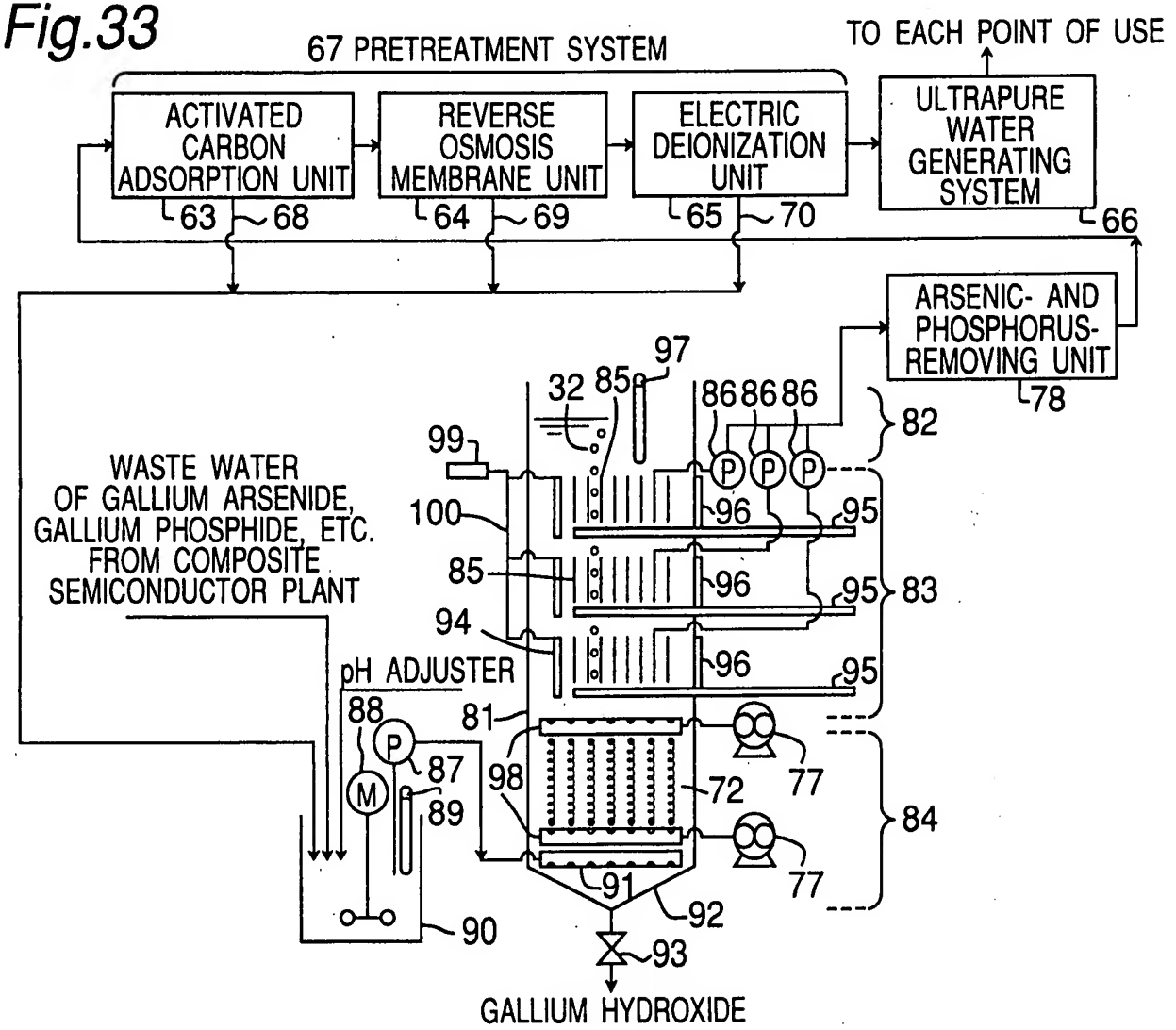

67 PRETREATMENT SYSTEM
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
ARSENIC- AND PHOSPHORUS-REMOVING UNIT
78
97
32
85
86 86 86
82
99
100
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
96
95
85
83
94
pH ADJUSTER
88
81
87
89
98
72
77
84
91
92
90
93
GALLIUM HYDROXIDE

Fig.34

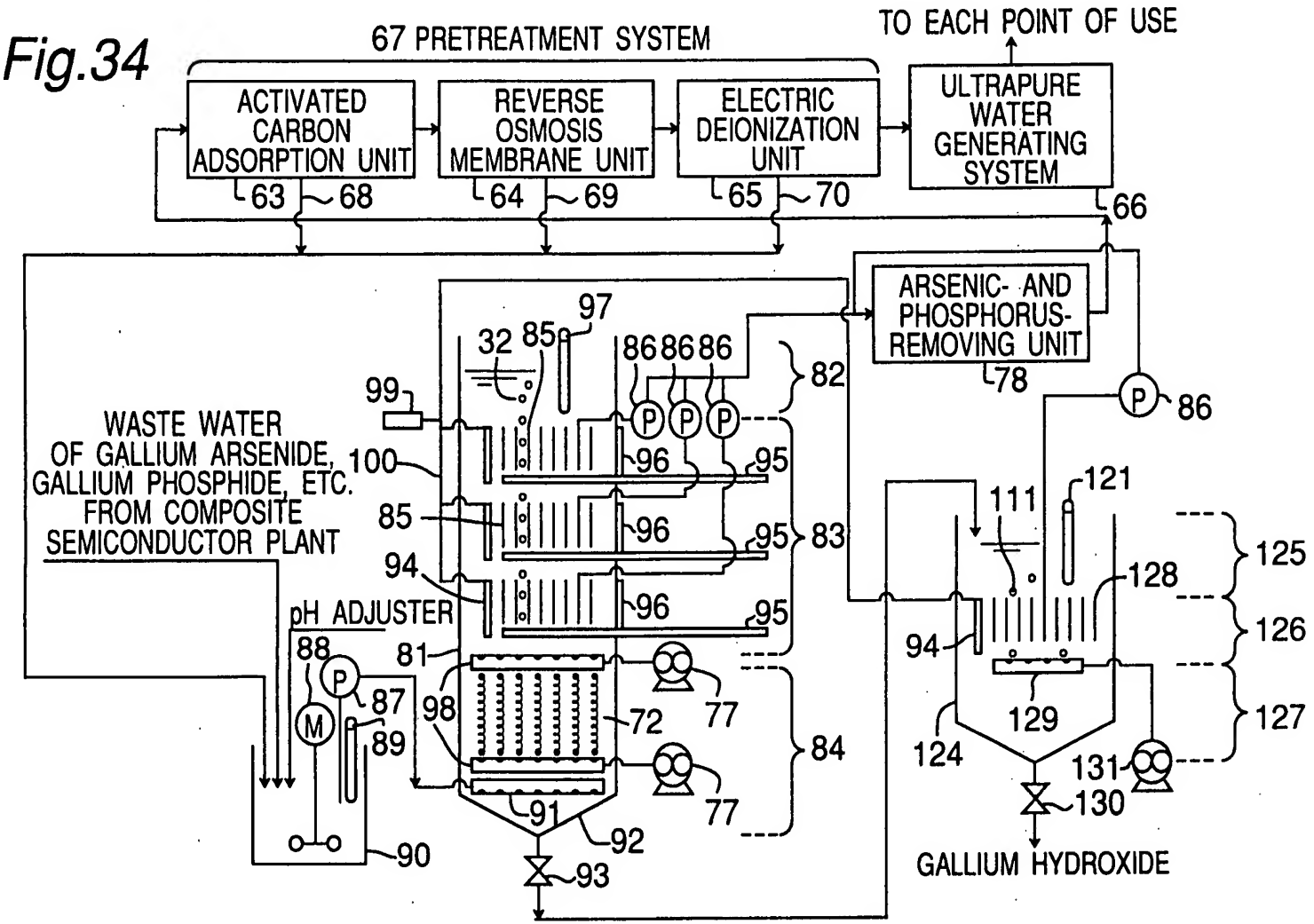

67 PRETREATMENT SYSTEM
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
ARSENIC- AND PHOSPHORUS-REMOVING UNIT
78
86
97
32
85
86
86
86
82
99
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
100
96
95
85
96
95
83
94
96
95
pH ADJUSTER
88
81
87
89
98
72
77
84
77
91
92
93
90
111
121
125
128
126
94
129
127
124
131
130
GALLIUM HYDROXIDE

Fig.35

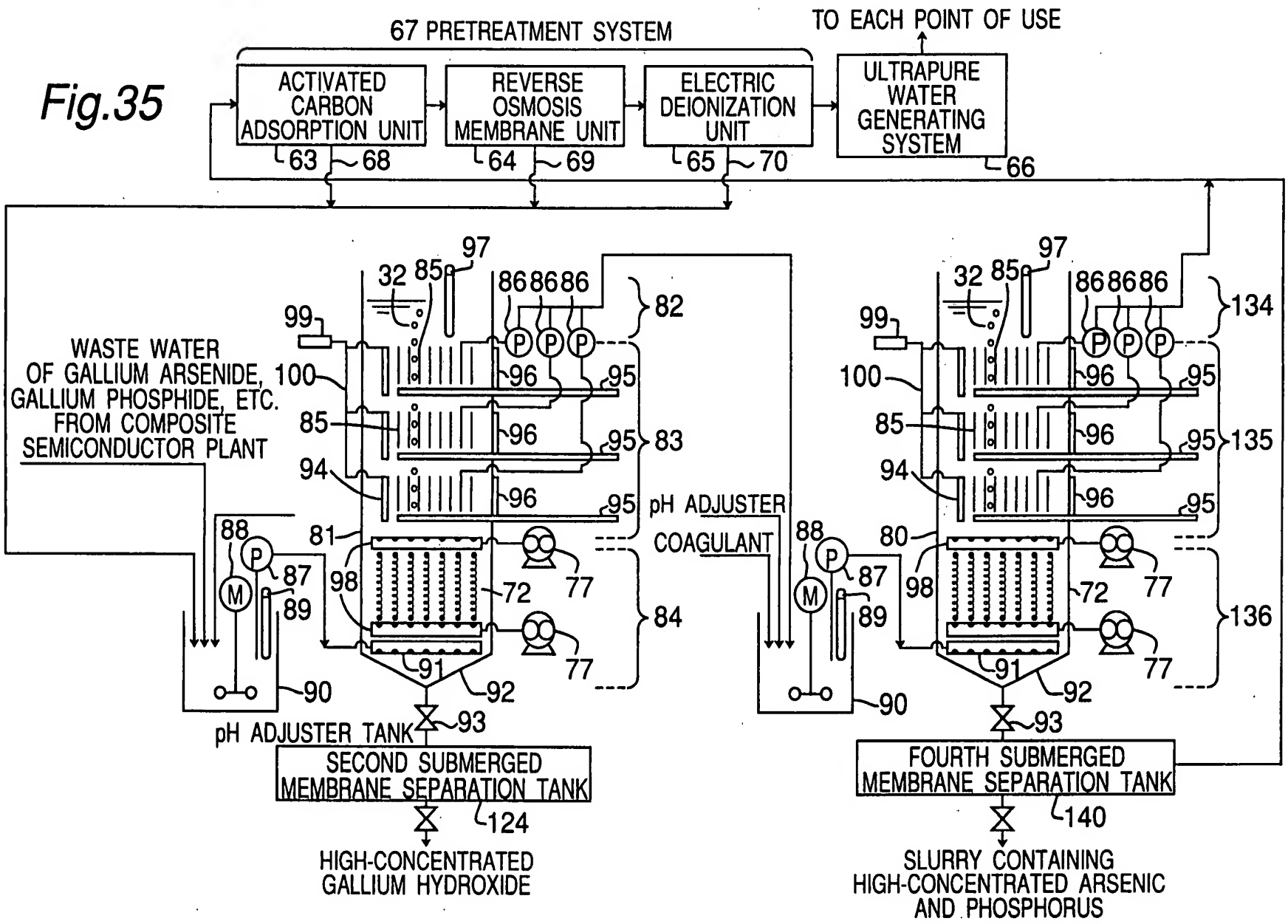

67 PRETREATMENT SYSTEM
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
COAGULANT
pH ADJUSTER TANK
SECOND SUBMERGED MEMBRANE SEPARATION TANK
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.36

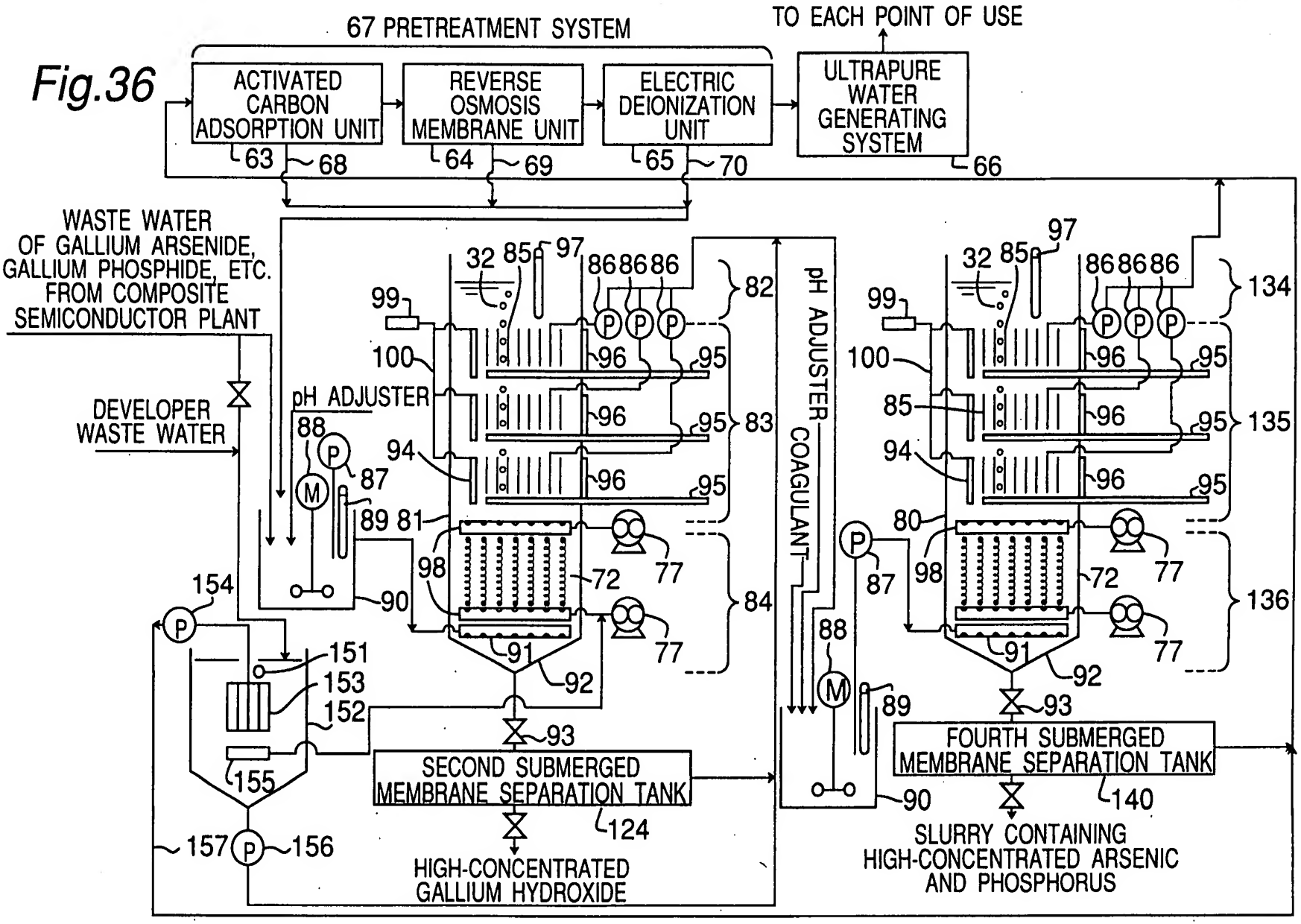

67 PRETREATMENT SYSTEM
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
SECOND SUBMERGED MEMBRANE SEPARATION TANK
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS
82
83
84
134
135
136
124
140

Fig.37

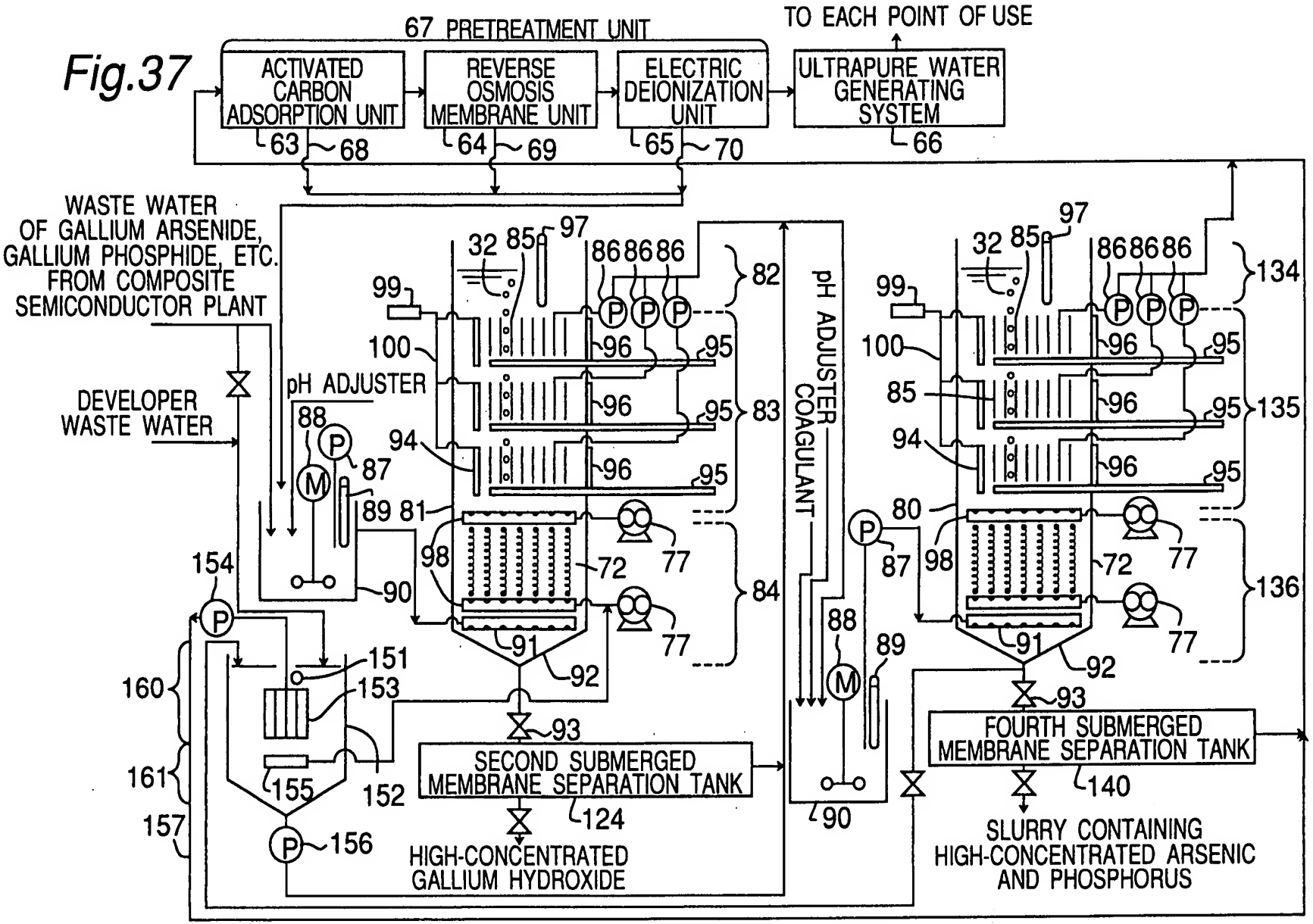

67 PRETREATMENT UNIT
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
TO EACH POINT OF USE
63
64
65
66
68
69
70
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
SECOND SUBMERGED MEMBRANE SEPARATION TANK
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS
82
83
84
134
135
136
124
140

Fig.38

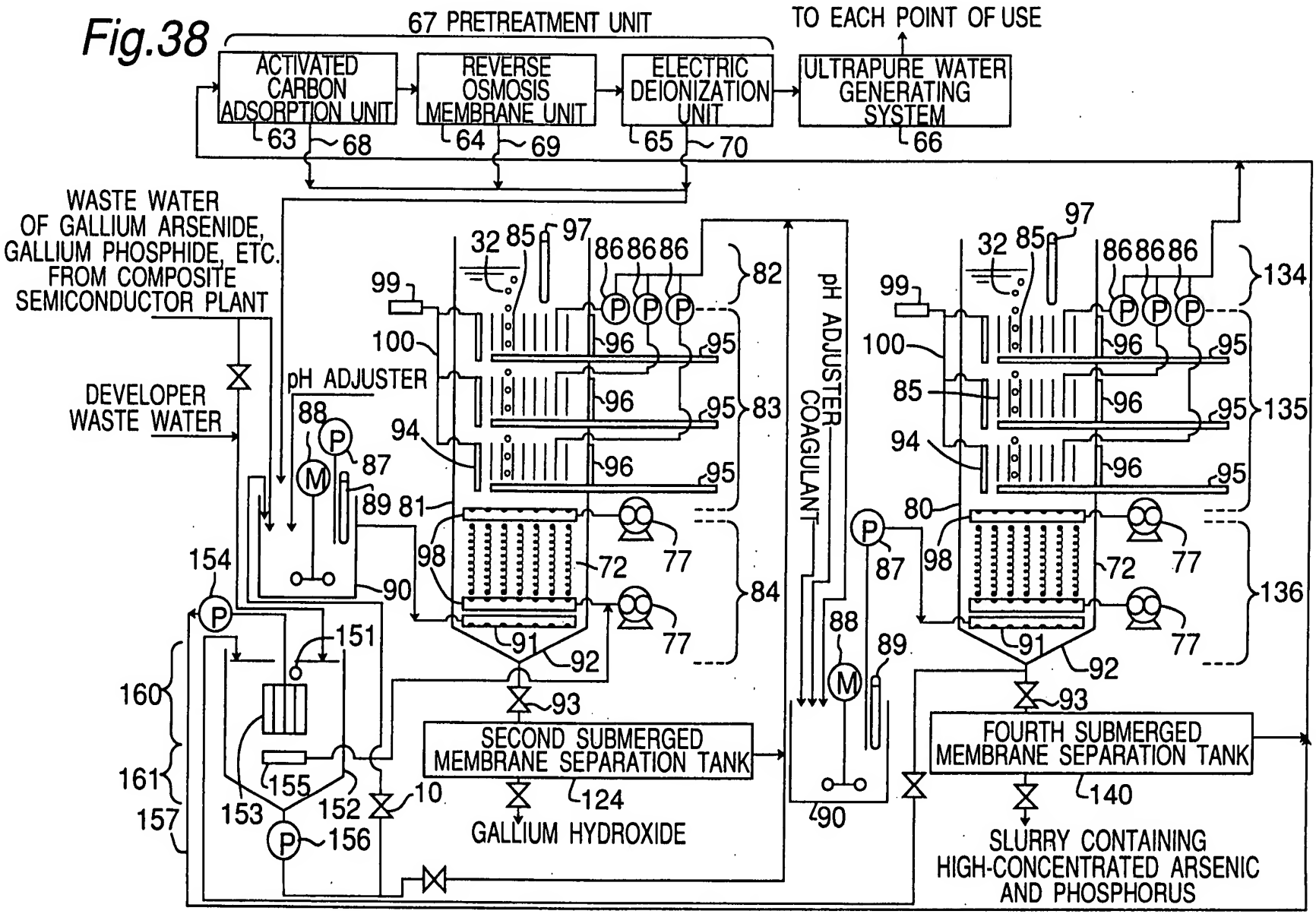

67 PRETREATMENT UNIT
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER COAGULANT
SECOND SUBMERGED MEMBRANE SEPARATION TANK
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS
124
140
90
93
10
151
152
153
154
155
156
157
160
161
80
81
82
83
84
85
86
87
88
89
91
92
94
95
96
97
98
99
100
72
77
134
135
136

Fig.39

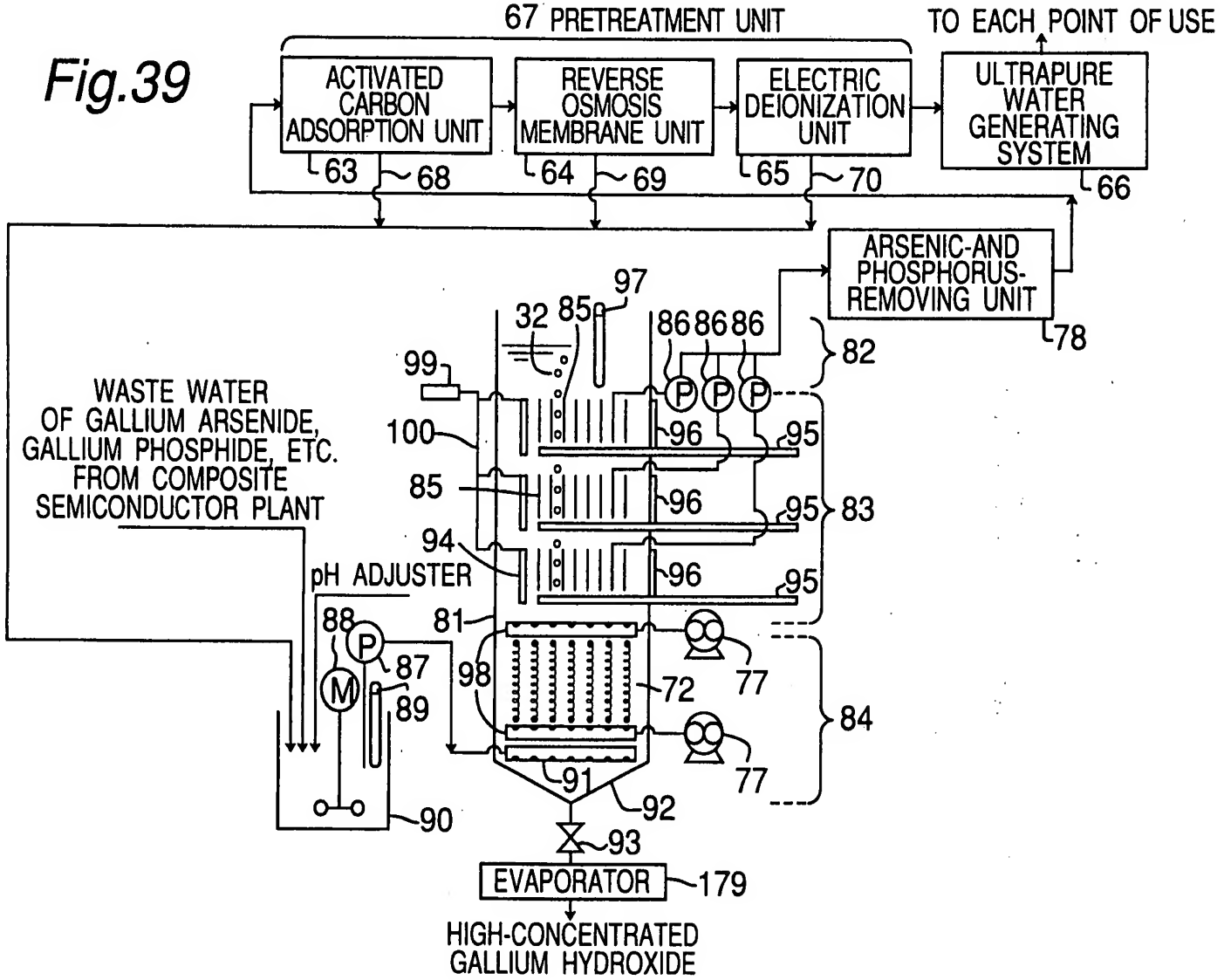

67 PRETREATMENT UNIT
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
ARSENIC-AND PHOSPHORUS-REMOVING UNIT
78
97
32
85
86 86 86
82
99
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
100
96
95
85
96
95
83
94
pH ADJUSTER
96
95
88
81
87
98
72
77
89
84
77
91
92
90
93
EVAPORATOR
179
HIGH-CONCENTRATED GALLIUM HYDROXIDE

Fig.40

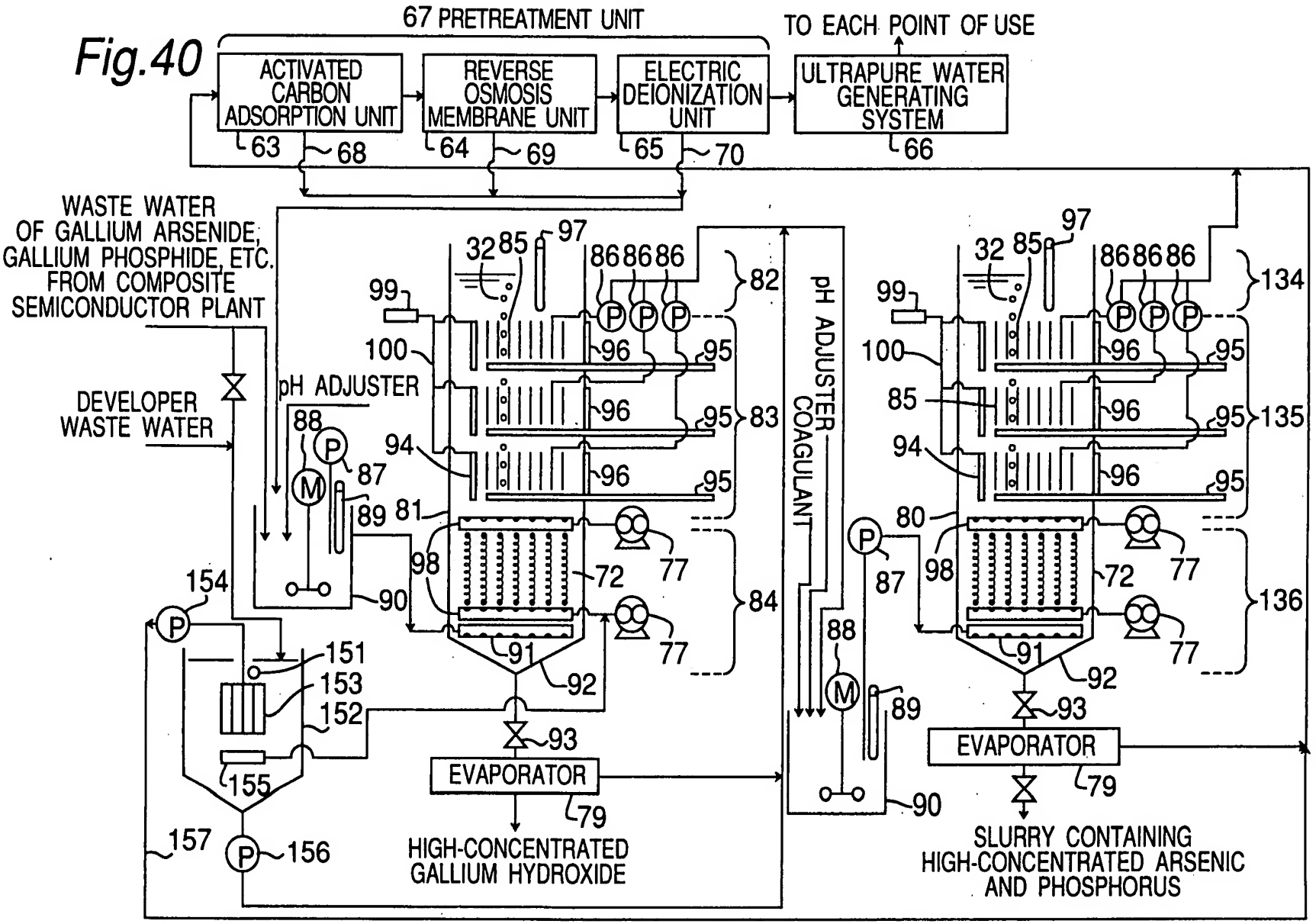

67 PRETREATMENT UNIT
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER COAGULANT
EVAPORATOR
EVAPORATOR
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.41

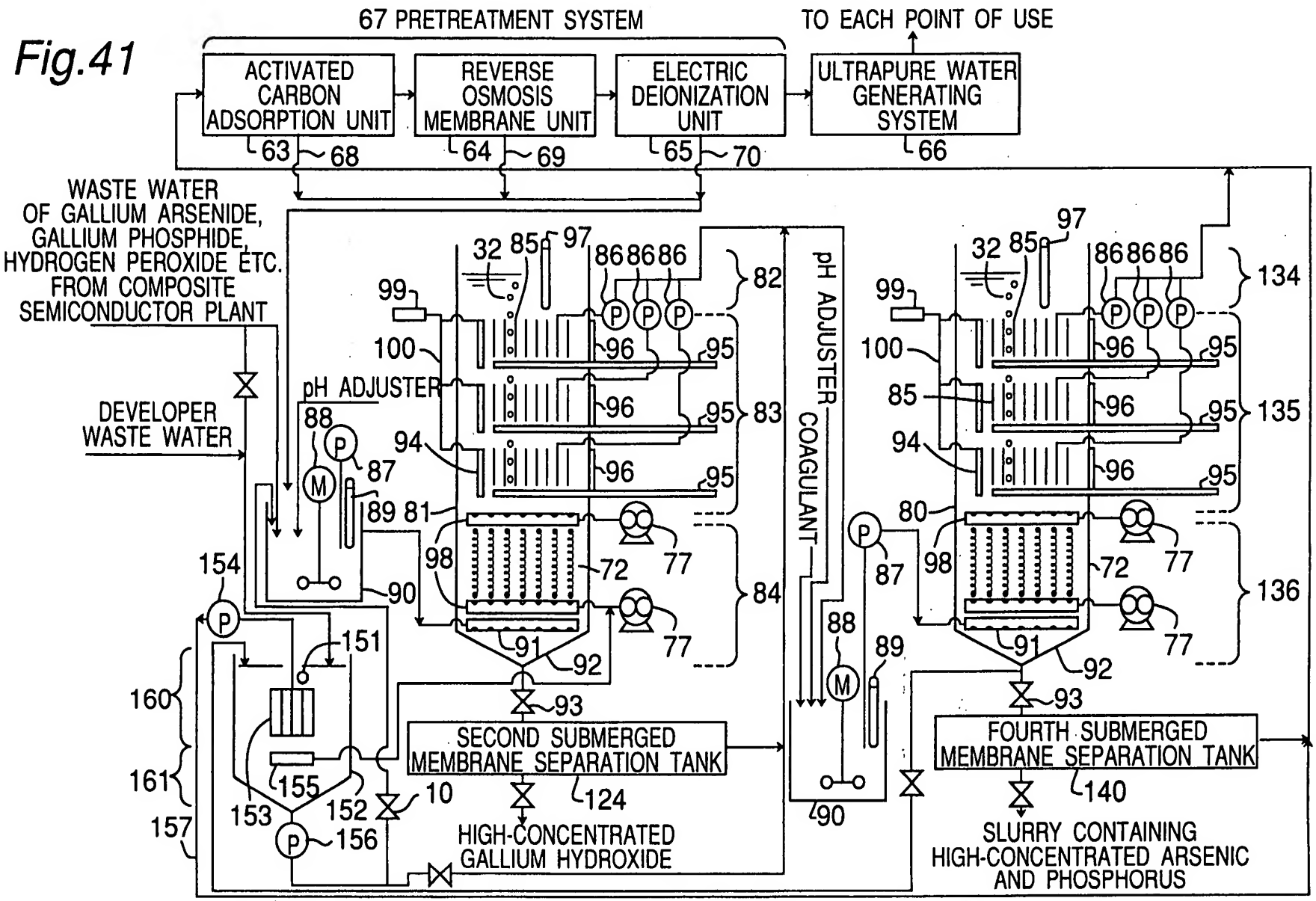

67 PRETREATMENT SYSTEM
TO EACH POINT OF USE
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
ULTRAPURE WATER GENERATING SYSTEM
63
68
64
69
65
70
66
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, HYDROGEN PEROXIDE ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
pH ADJUSTER
COAGULANT
SECOND SUBMERGED MEMBRANE SEPARATION TANK
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
HIGH-CONCENTRATED GALLIUM HYDROXIDE
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS
82
83
84
134
135
136
124
140
90
93
10

Fig.42A

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE NORMAL CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)										
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.
SUBMERGED MEMBRANE SEPARATION TANK	2 HR.											
SECOND SUBMERGED MEMBRANE SEPARATION TANK	4 HR.											

Fig.42B

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE LOW CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)										
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.											
SECOND SUBMERGED MEMBRANE SEPARATION TANK	2 HR.											

Fig.43

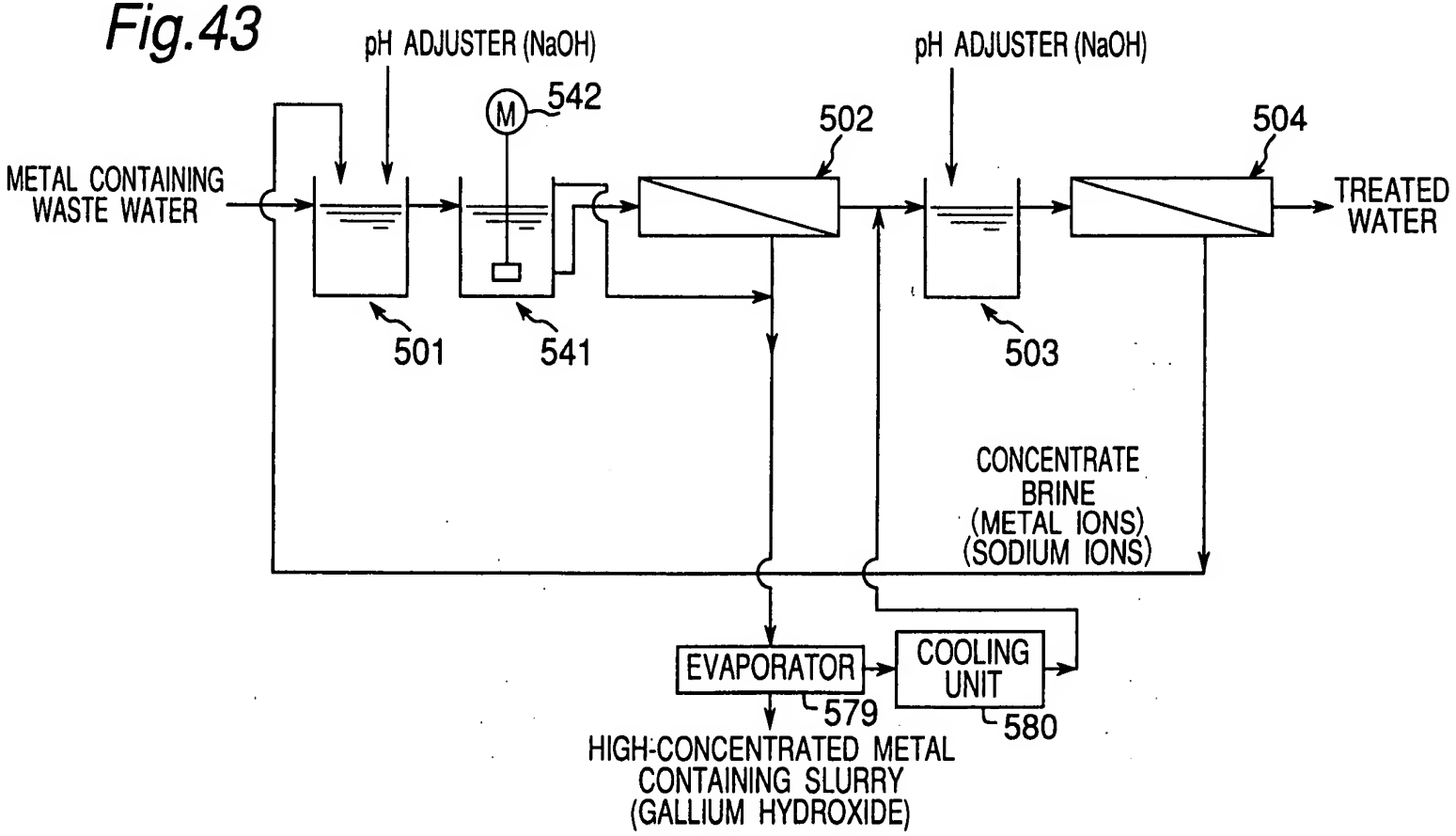

pH ADJUSTER (NaOH)
542
M
pH ADJUSTER (NaOH)
502
504
METAL CONTAINING WASTE WATER
TREATED WATER
501
541
503
CONCENTRATE BRINE (METAL IONS) (SODIUM IONS)
EVAPORATOR
579
COOLING UNIT
580
HIGH-CONCENTRATED METAL CONTAINING SLURRY (GALLIUM HYDROXIDE)

Fig.44

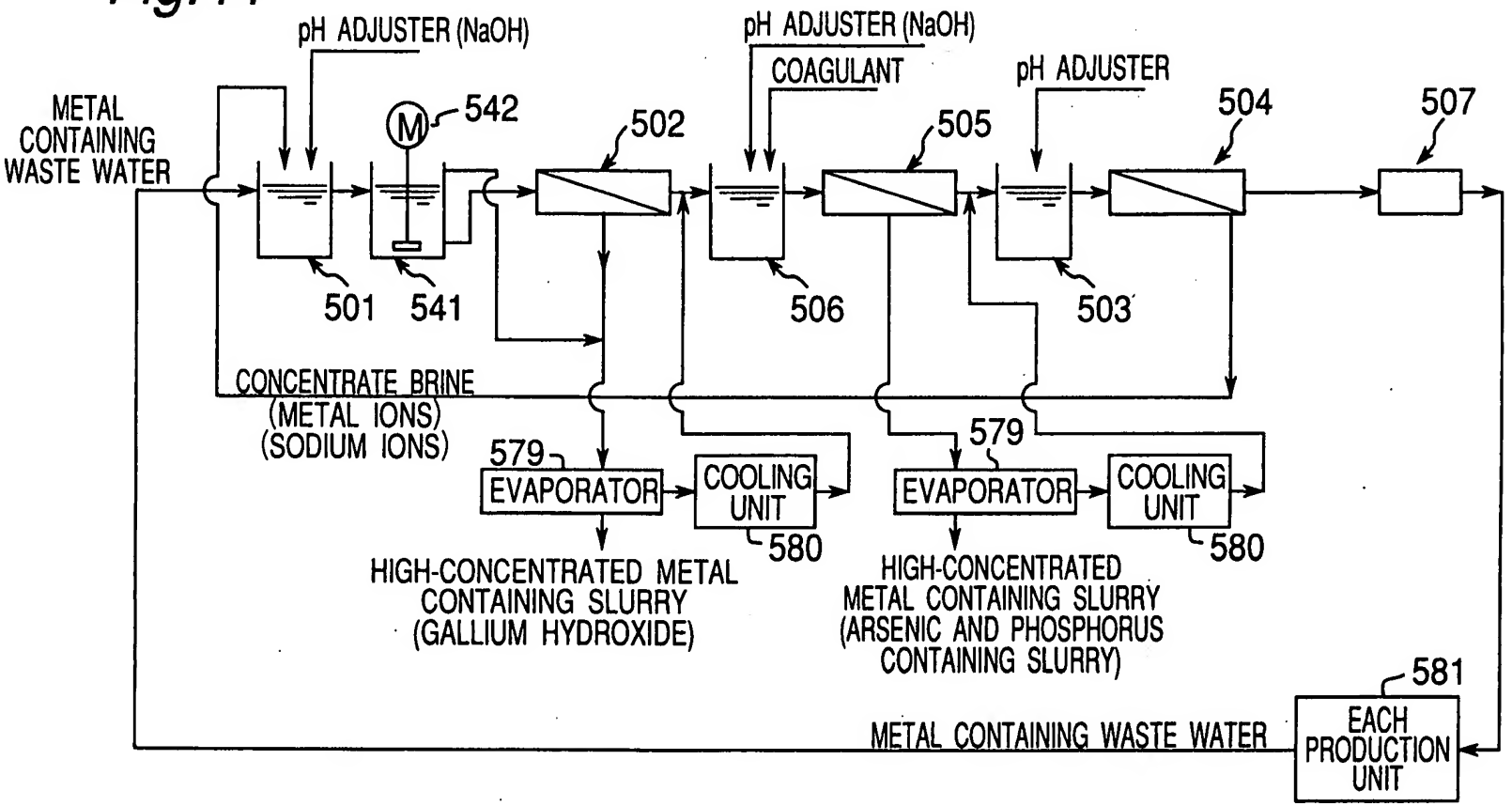

pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
METAL CONTAINING WASTE WATER
M
542
502
505
504
507
501
541
506
503
CONCENTRATE BRINE (METAL IONS) (SODIUM IONS)
579
579
EVAPORATOR
COOLING UNIT
EVAPORATOR
COOLING UNIT
580
580
HIGH-CONCENTRATED METAL CONTAINING SLURRY (GALLIUM HYDROXIDE)
HIGH-CONCENTRATED METAL CONTAINING SLURRY (ARSENIC AND PHOSPHORUS CONTAINING SLURRY)
581
METAL CONTAINING WASTE WATER
EACH PRODUCTION UNIT

Fig.45

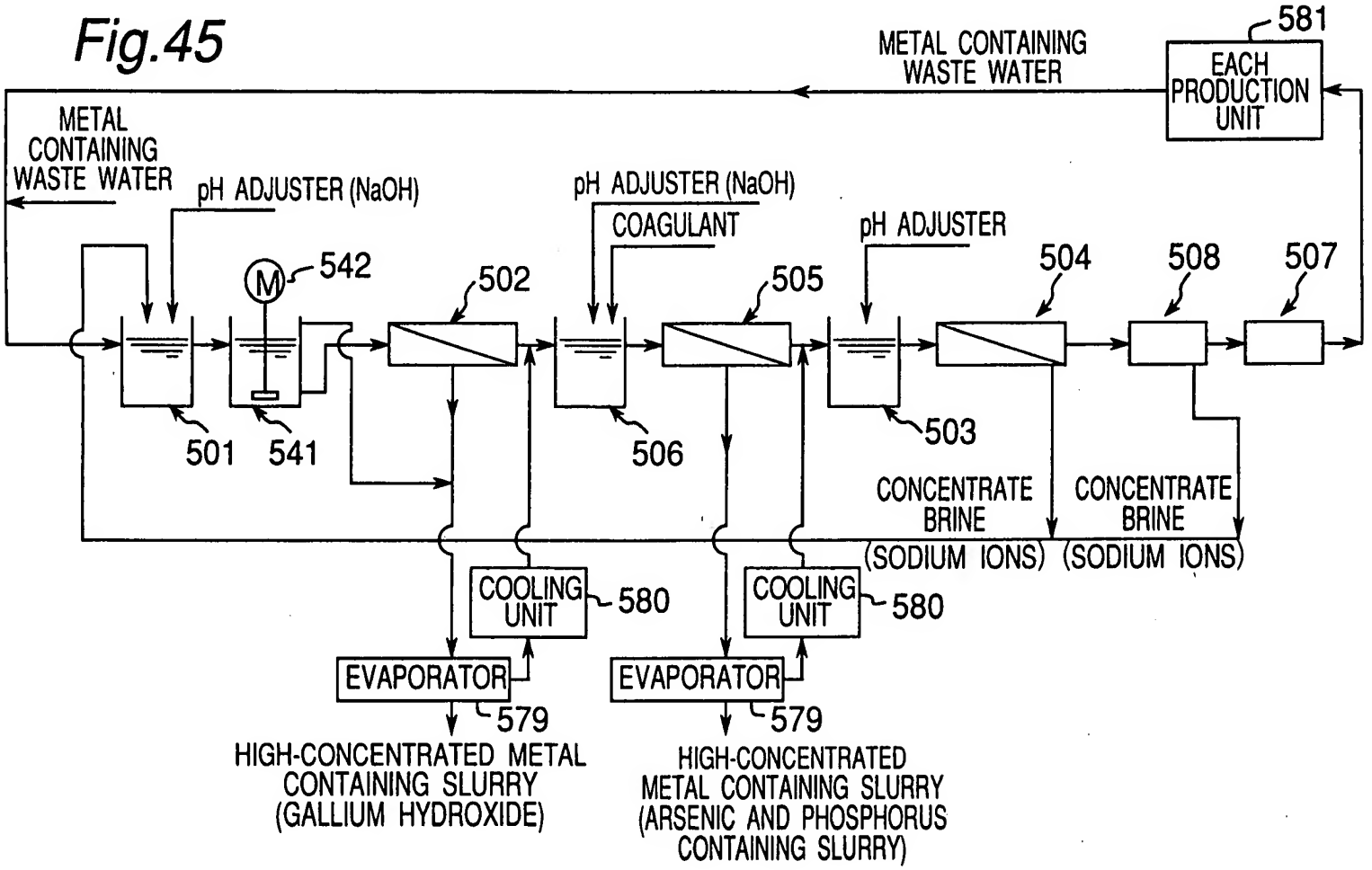

581
METAL CONTAINING WASTE WATER
EACH PRODUCTION UNIT
METAL CONTAINING WASTE WATER
pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
542
502
505
504
508
507
501
541
506
503
CONCENTRATE BRINE (SODIUM IONS)
CONCENTRATE BRINE (SODIUM IONS)
COOLING UNIT
580
COOLING UNIT
580
EVAPORATOR
579
EVAPORATOR
579
HIGH-CONCENTRATED METAL CONTAINING SLURRY (GALLIUM HYDROXIDE)
HIGH-CONCENTRATED METAL CONTAINING SLURRY (ARSENIC AND PHOSPHORUS CONTAINING SLURRY)

Fig.46

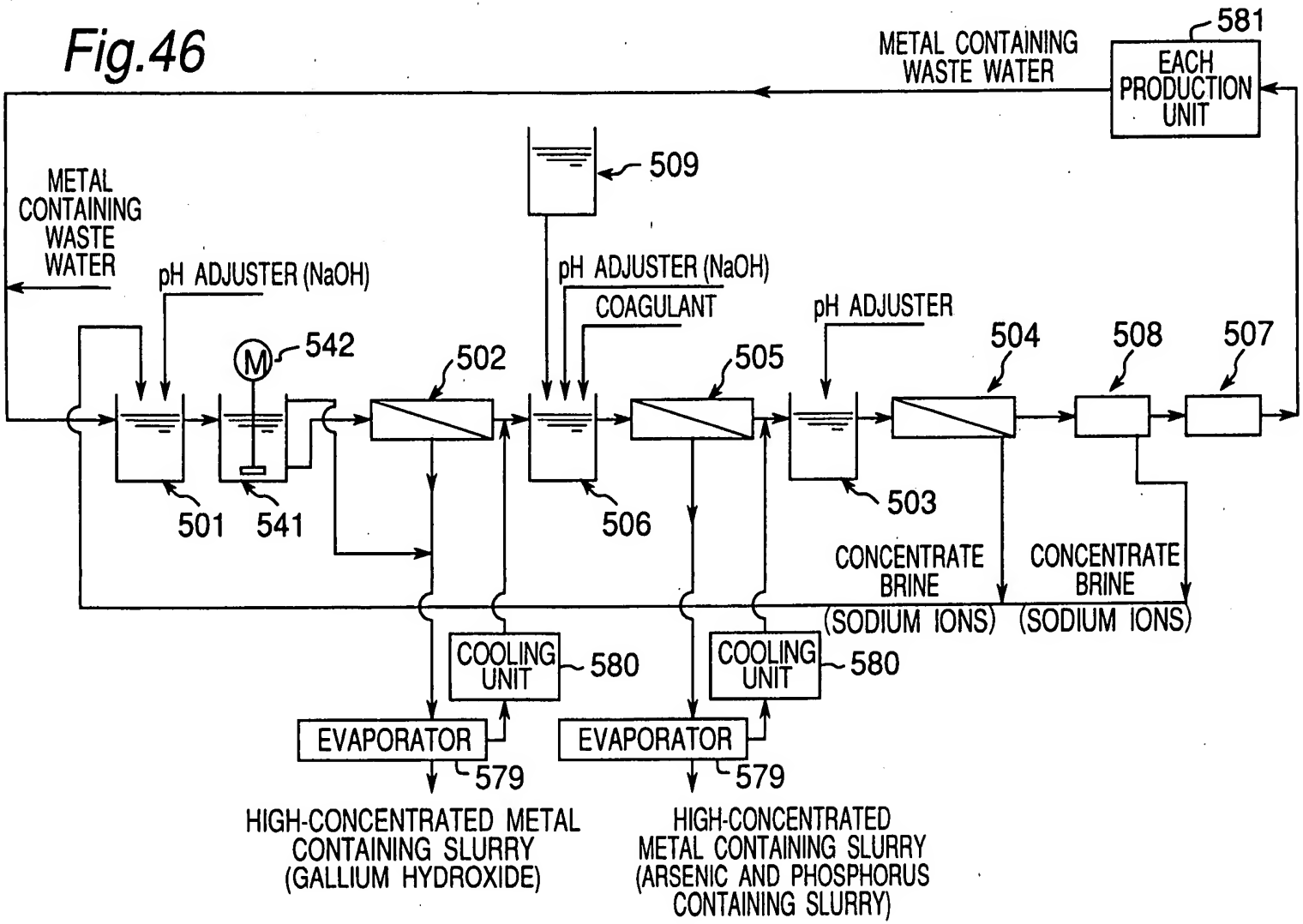

METAL CONTAINING WASTE WATER
581
EACH PRODUCTION UNIT
509
METAL CONTAINING WASTE WATER
pH ADJUSTER (NaOH)
pH ADJUSTER (NaOH)
COAGULANT
pH ADJUSTER
542
502
505
504
508
507
501
541
506
503
CONCENTRATE BRINE (SODIUM IONS)
CONCENTRATE BRINE (SODIUM IONS)
COOLING UNIT
580
COOLING UNIT
580
EVAPORATOR
579
EVAPORATOR
579
HIGH-CONCENTRATED METAL CONTAINING SLURRY (GALLIUM HYDROXIDE)
HIGH-CONCENTRATED METAL CONTAINING SLURRY (ARSENIC AND PHOSPHORUS CONTAINING SLURRY)

Fig.47

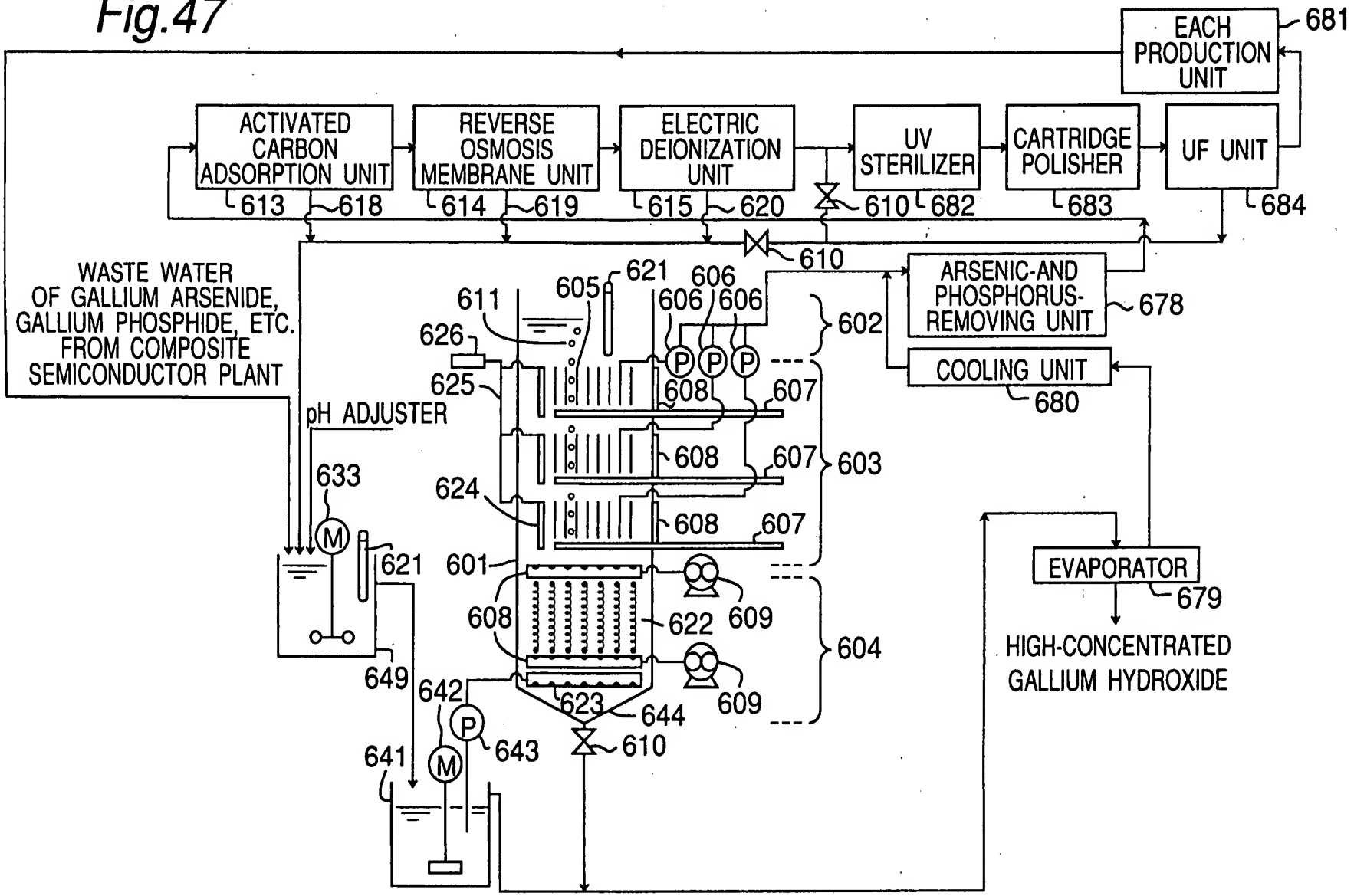

EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
610
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
ARSENIC-AND PHOSPHORUS-REMOVING UNIT
678
COOLING UNIT
680
602
603
604
pH ADJUSTER
633
621
605
606
611
626
625
608
607
624
601
609
622
623
644
642
643
641
649
EVAPORATOR
679
HIGH-CONCENTRATED GALLIUM HYDROXIDE

Fig.48

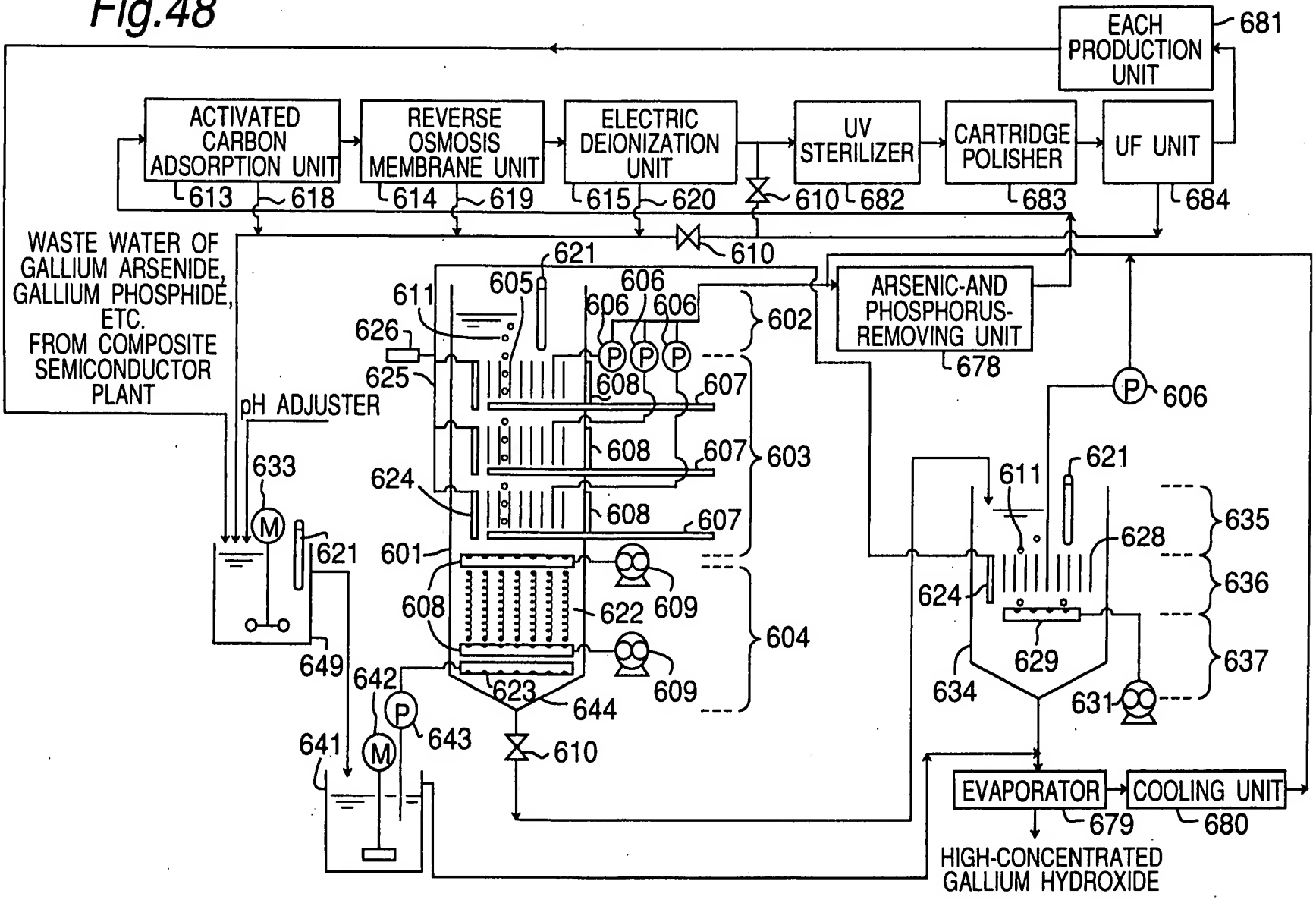

EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
610
UV STERILIZER
682
CARTRIDGE POLISHER
683
UF UNIT
684
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
621
605
606
611
626
625
602
608
607
603
624
601
609
622
604
623
644
642
643
641
649
633
ARSENIC-AND PHOSPHORUS-REMOVING UNIT
678
635
636
637
628
629
634
631
EVAPORATOR
679
COOLING UNIT
680
HIGH-CONCENTRATED GALLIUM HYDROXIDE

Fig.49

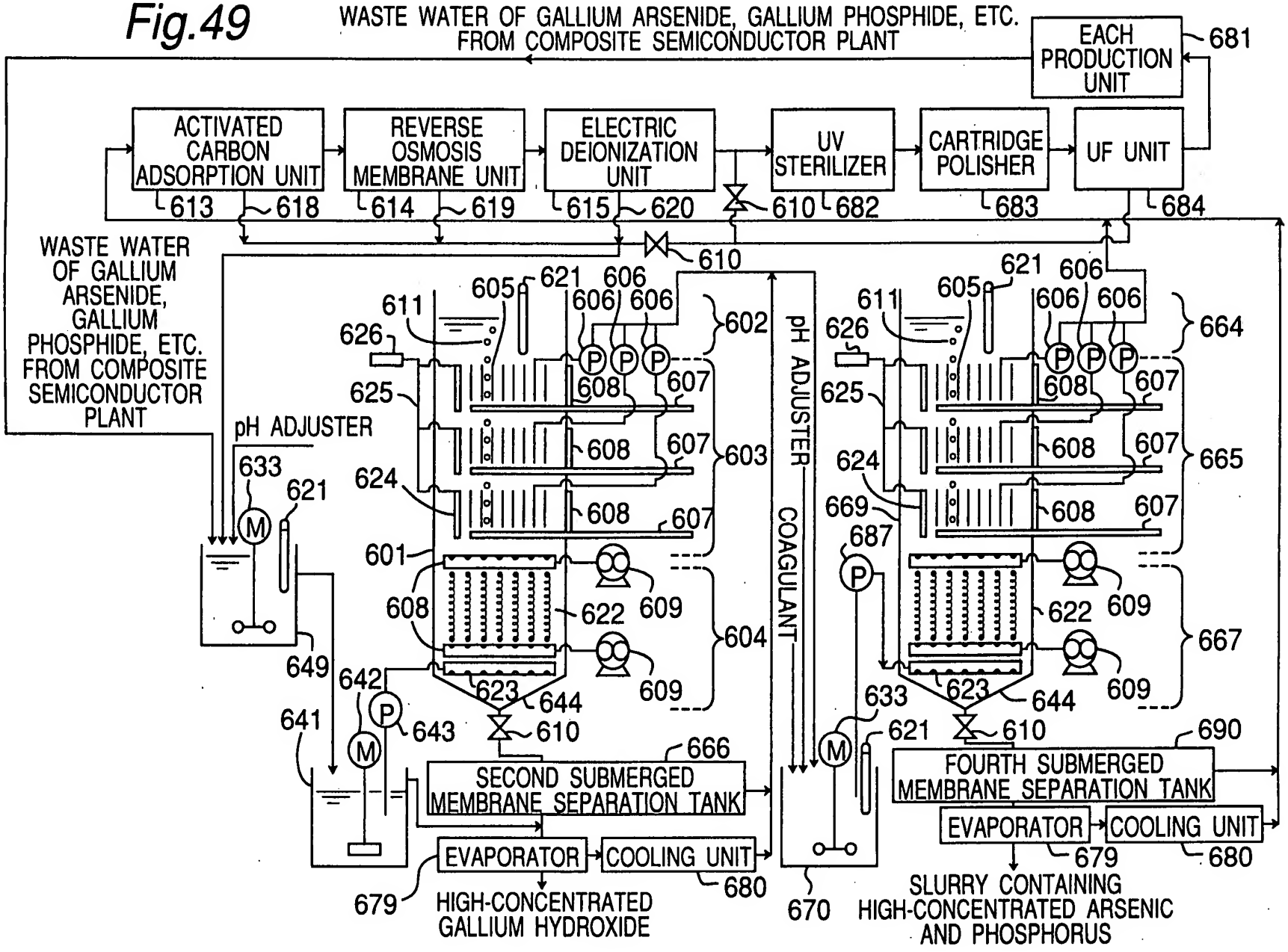

WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
REVERSE OSMOSIS MEMBRANE UNIT
ELECTRIC DEIONIZATION UNIT
UV STERILIZER
CARTRIDGE POLISHER
UF UNIT
613
618
614
619
615
620
610
682
683
684
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
pH ADJUSTER
633
621
649
611
605
606
626
625
624
601
608
607
602
603
604
609
622
623
644
642
643
641
666
SECOND SUBMERGED MEMBRANE SEPARATION TANK
EVAPORATOR
COOLING UNIT
679
680
HIGH-CONCENTRATED GALLIUM HYDROXIDE
pH ADJUSTER
COAGULANT
670
669
687
664
665
667
690
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.50

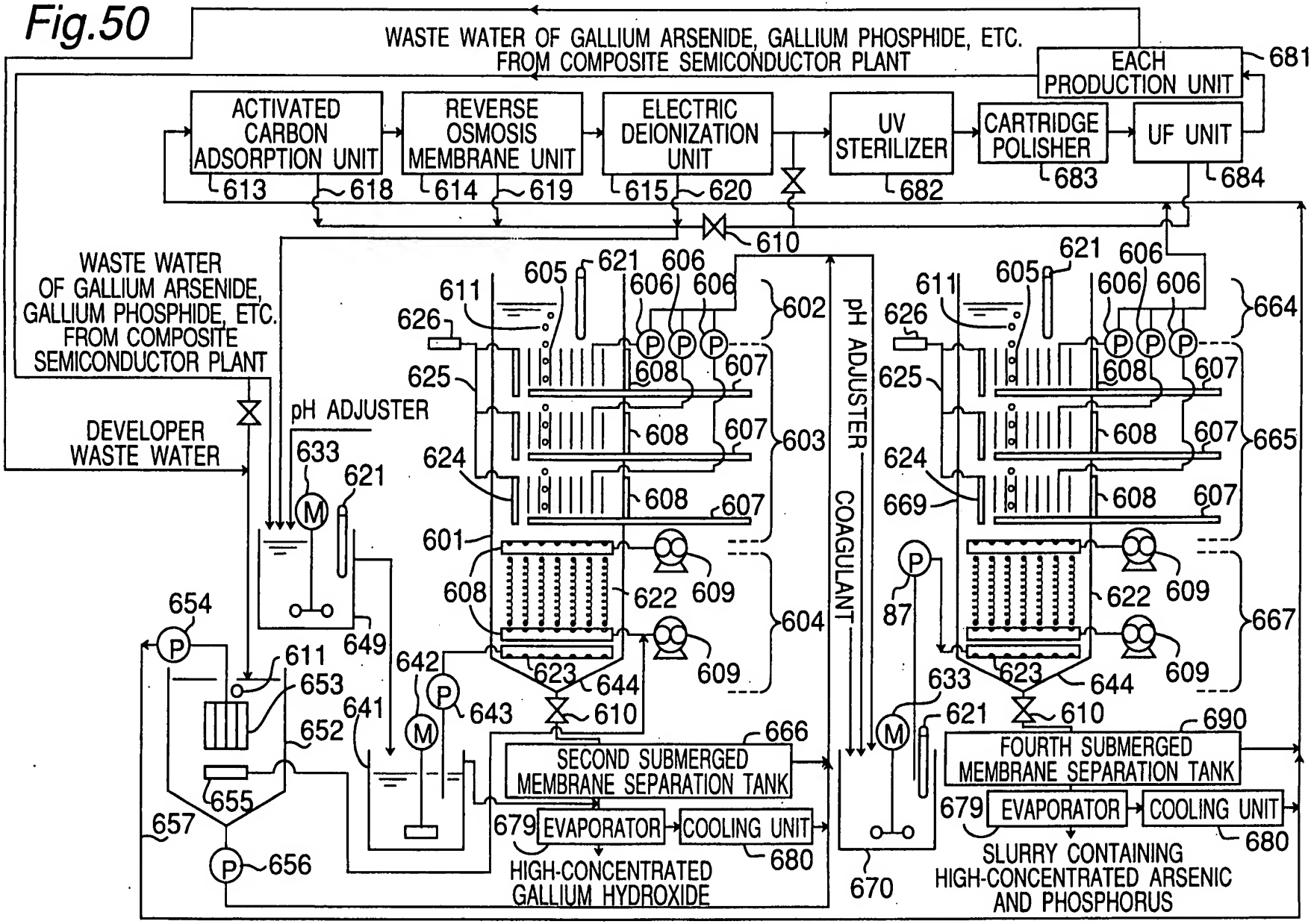

WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
633
621
605
606
611
626
625
624
601
608
607
602
603
604
609
622
623
644
pH ADJUSTER
COAGULANT
664
665
667
669
87
654
649
653
652
655
657
656
642
641
643
666
SECOND SUBMERGED MEMBRANE SEPARATION TANK
679
EVAPORATOR
COOLING UNIT
680
HIGH-CONCENTRATED GALLIUM HYDROXIDE
670
690
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.51

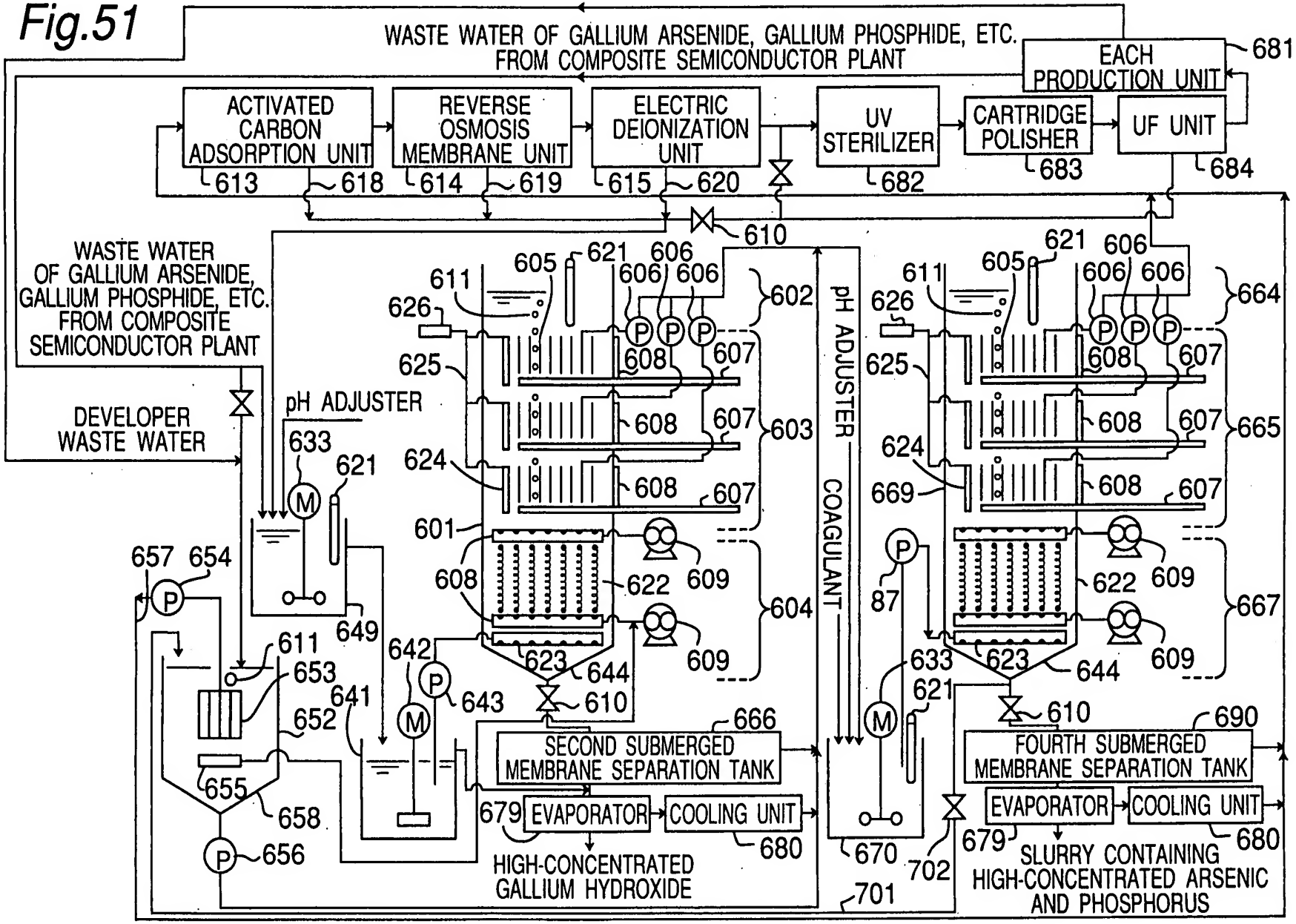

WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
633
621
649
657
654
611
653
652
655
658
656
641
642
643
610
601
602
603
604
605
606
607
608
609
622
623
624
625
626
644
pH ADJUSTER
COAGULANT
666
SECOND SUBMERGED MEMBRANE SEPARATION TANK
679
EVAPORATOR
COOLING UNIT
680
HIGH-CONCENTRATED GALLIUM HYDROXIDE
670
701
702
664
665
667
669
87
690
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.52

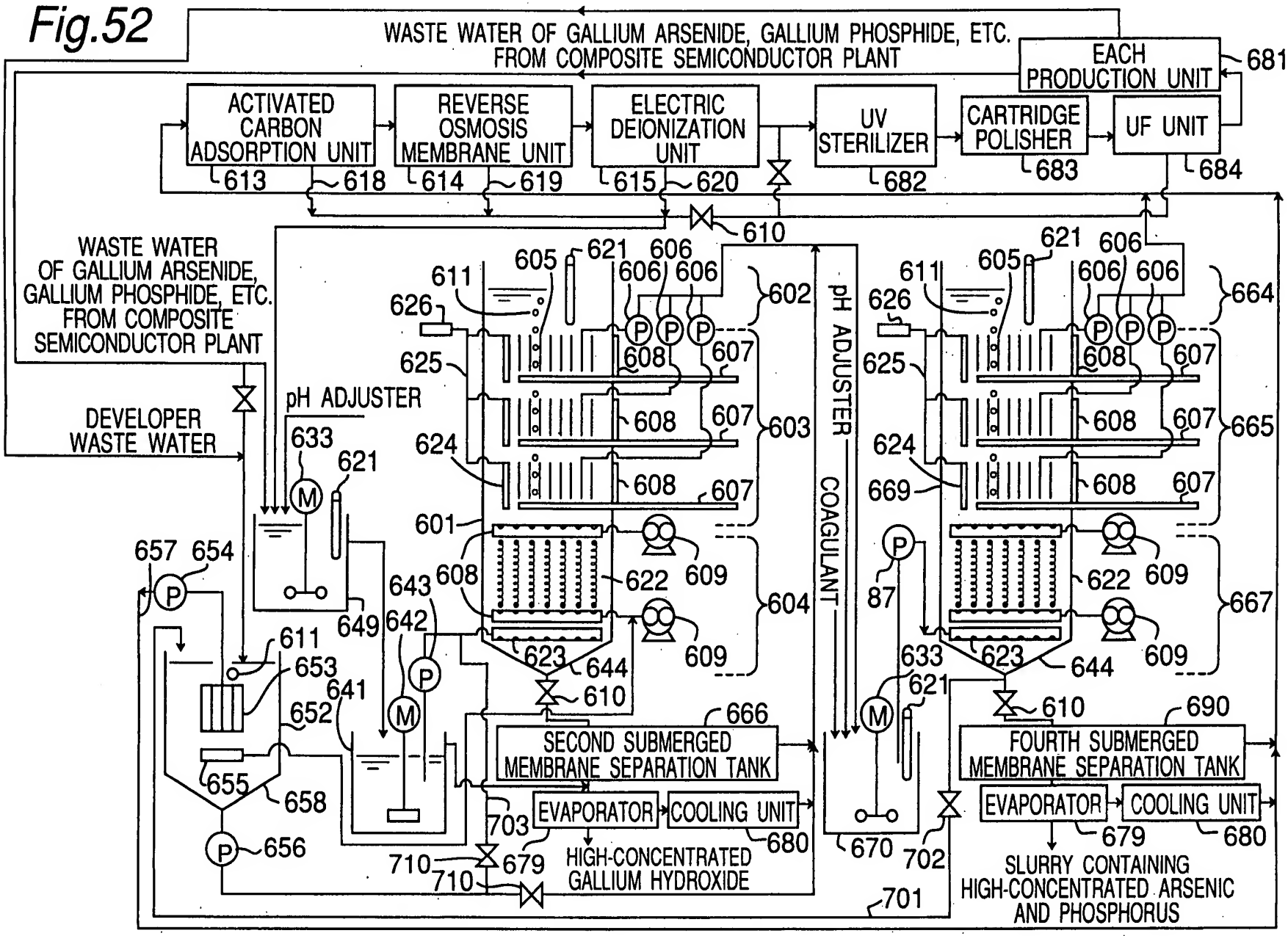

WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
633
621
649
657
654
611
653
652
655
658
656
641
643
642
601
608
622
609
623
644
602
603
604
605
606
607
625
626
624
pH ADJUSTER
COAGULANT
664
665
667
669
87
666
SECOND SUBMERGED MEMBRANE SEPARATION TANK
EVAPORATOR
COOLING UNIT
680
703
679
710
HIGH-CONCENTRATED GALLIUM HYDROXIDE
670
702
690
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS
701

Fig.53

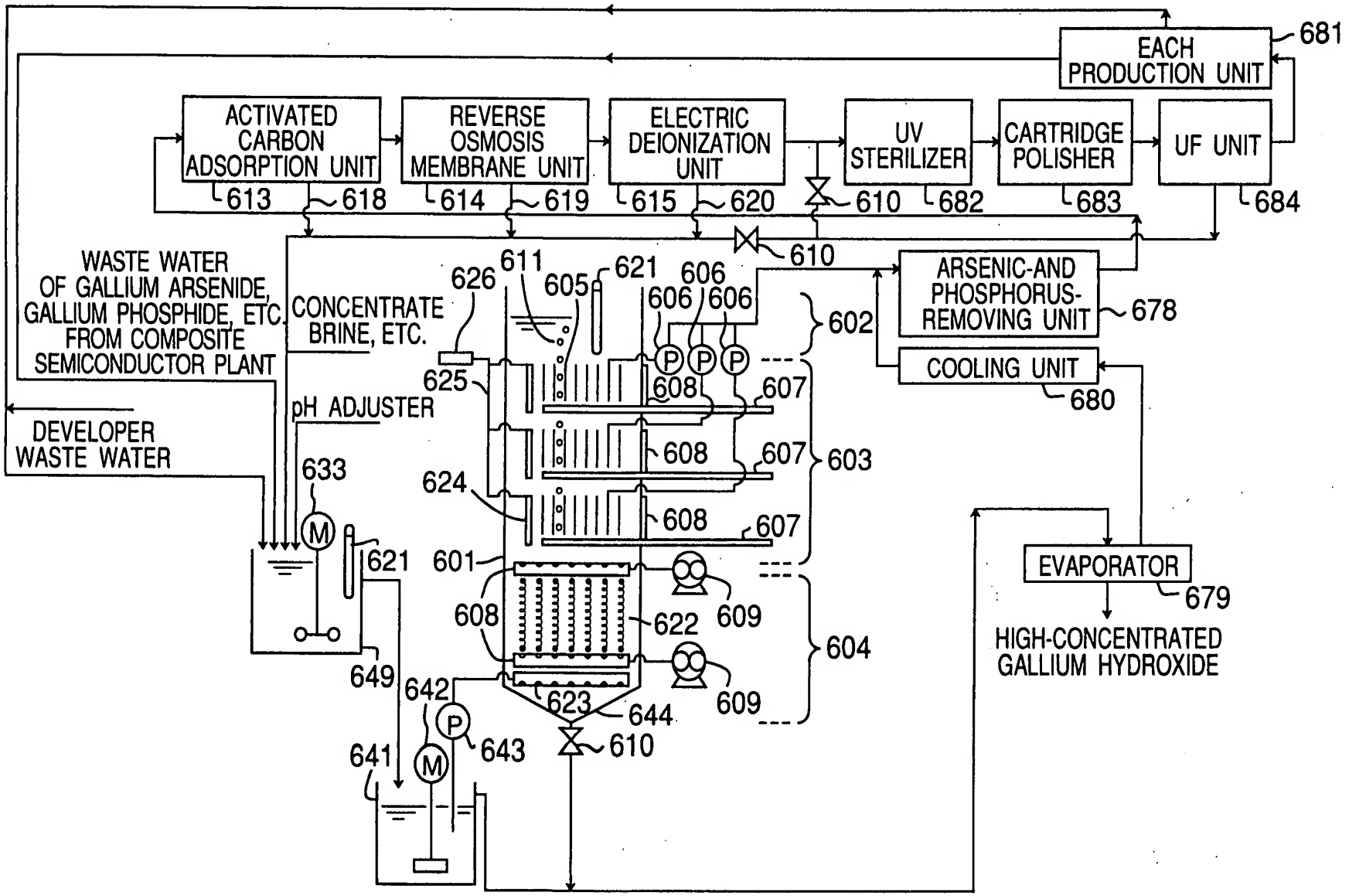
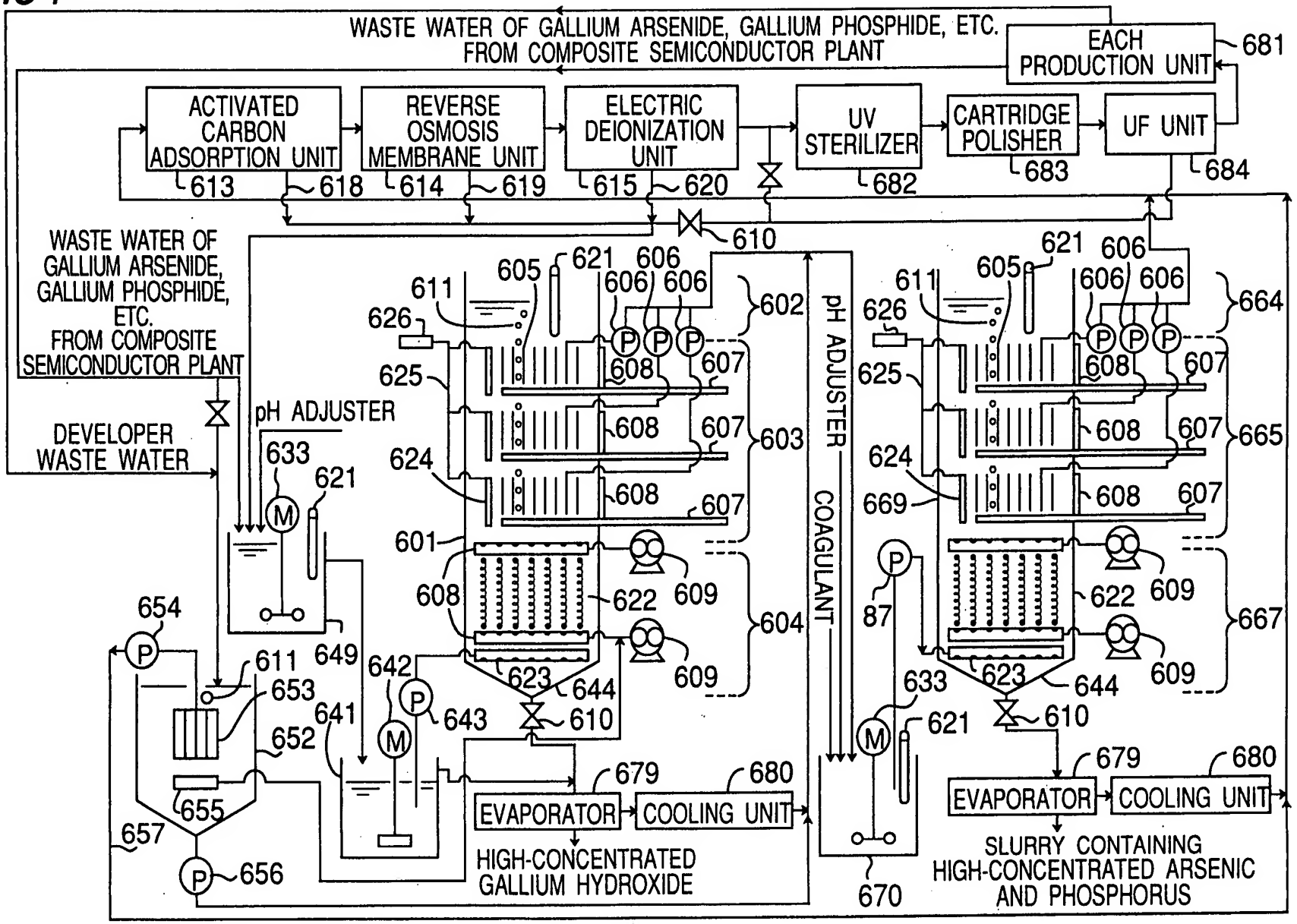

EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
610
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
CONCENTRATE BRINE, ETC.
626
611
605
621
606
606
606
602
ARSENIC-AND PHOSPHORUS-REMOVING UNIT
678
COOLING UNIT
680
625
608
607
pH ADJUSTER
DEVELOPER WASTE WATER
633
608
607
603
624
608
607
621
601
609
608
622
609
604
649
642
623
644
609
641
643
610
EVAPORATOR
679
HIGH-CONCENTRATED GALLIUM HYDROXIDE

Fig.54


WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
633
621
605
606
611
626
625
624
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608
607
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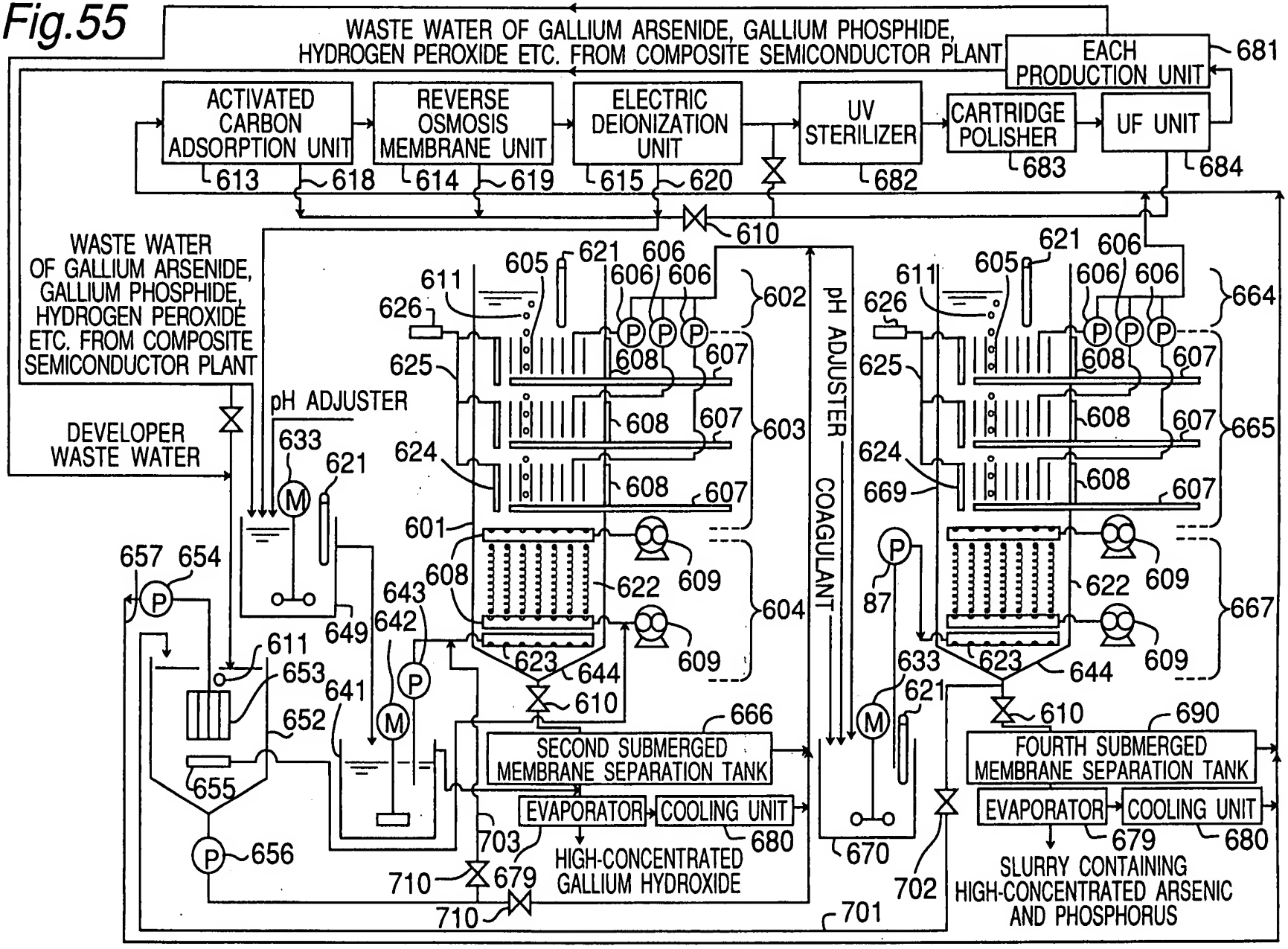
603
604
609
622
623
644
610
pH ADJUSTER
COAGULANT
654
649
653
652
655
657
656
642
643
641
679
680
EVAPORATOR
COOLING UNIT
HIGH-CONCENTRATED GALLIUM HYDROXIDE
664
665
667
669
87
670
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.55


WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, HYDROGEN PEROXIDE ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
EACH PRODUCTION UNIT
681
ACTIVATED CARBON ADSORPTION UNIT
613
618
REVERSE OSMOSIS MEMBRANE UNIT
614
619
ELECTRIC DEIONIZATION UNIT
615
620
UV STERILIZER
682
CARTRIDGE POLISHER
683
UF UNIT
684
610
WASTE WATER OF GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, HYDROGEN PEROXIDE ETC. FROM COMPOSITE SEMICONDUCTOR PLANT
DEVELOPER WASTE WATER
pH ADJUSTER
633
621
605
606
611
626
625
624
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623
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649
642
643
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655
656
657
654
703
710
679
680
HIGH-CONCENTRATED GALLIUM HYDROXIDE
666
SECOND SUBMERGED MEMBRANE SEPARATION TANK
EVAPORATOR
COOLING UNIT
pH ADJUSTER
COAGULANT
670
701
702
664
665
667
669
87
690
FOURTH SUBMERGED MEMBRANE SEPARATION TANK
SLURRY CONTAINING HIGH-CONCENTRATED ARSENIC AND PHOSPHORUS

Fig.56A

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE NORMAL CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)										
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.
SUBMERGED MEMBRANE SEPARATION TANK	2 HR.											
SECOND SUBMERGED MEMBRANE SEPARATION TANK	4 HR.											

Fig.56B

WHEN CONCENTRATIONS OF GALLIUM AND ARSENIC ARE LOW CONCENTRATIONS

TANK NAME	RESIDENCE TIME	TIMING (RESIDENCE TIME)										
		1 HR.	2 HR.	3 HR.	4 HR.	5 HR.	6 HR.	7 HR.	8 HR.	9 HR.	10 HR.	11 HR.
SUBMERGED MEMBRANE SEPARATION TANK	1 HR.											
SECOND SUBMERGED MEMBRANE SEPARATION TANK	2 HR.											

Fig.57

STRUCTURE OF FOAM SEPARATION TANK

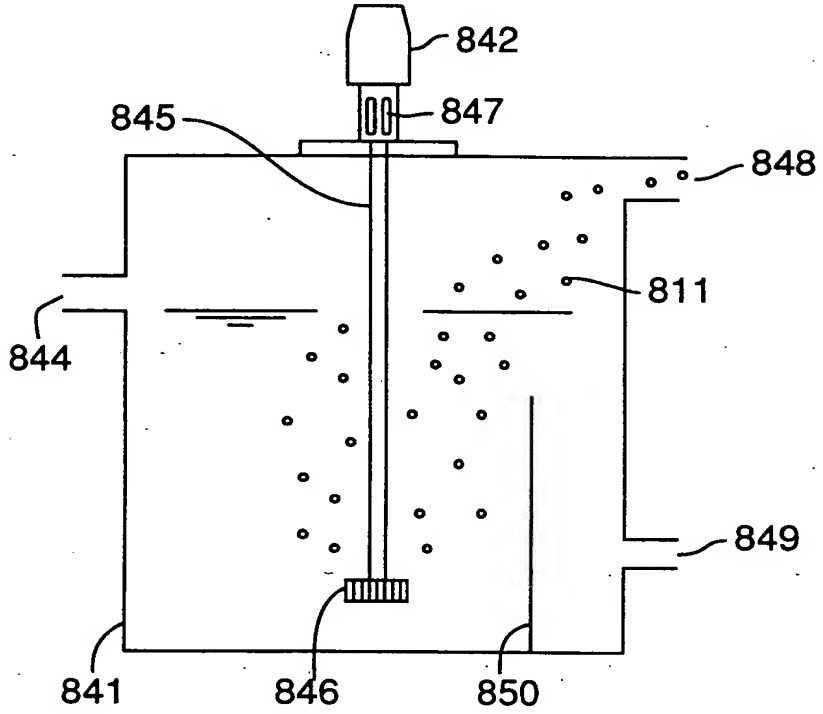

Fig. 58

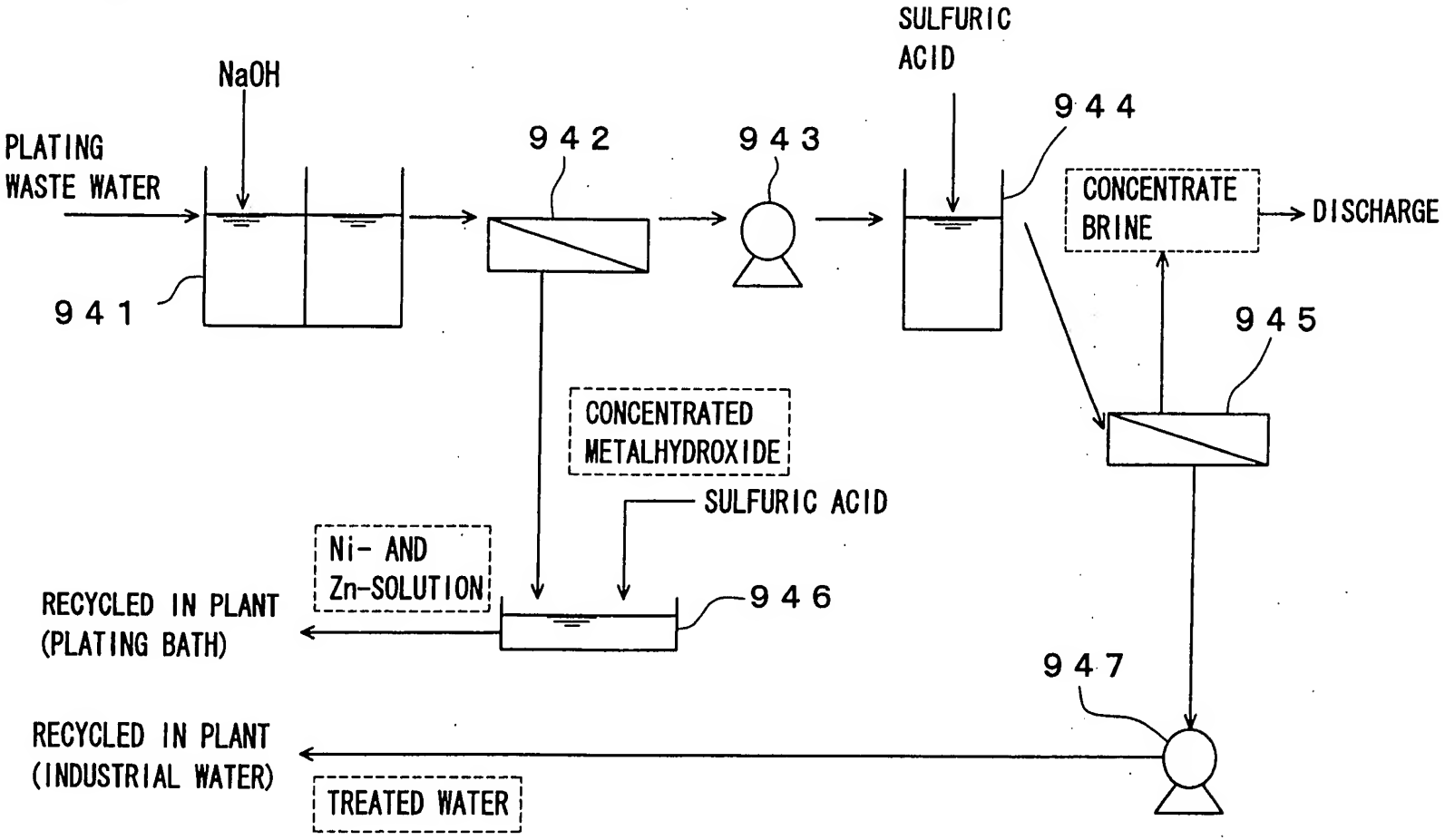
NaOH
SULFURIC ACID
PLATING WASTE WATER
942
943
944
941
CONCENTRATE BRINE
DISCHARGE
945
CONCENTRATED METALHYDROXIDE
SULFURIC ACID
Ni- AND Zn-SOLUTION
946
RECYCLED IN PLANT (PLATING BATH)
947
RECYCLED IN PLANT (INDUSTRIAL WATER)
TREATED WATER

Fig. 59

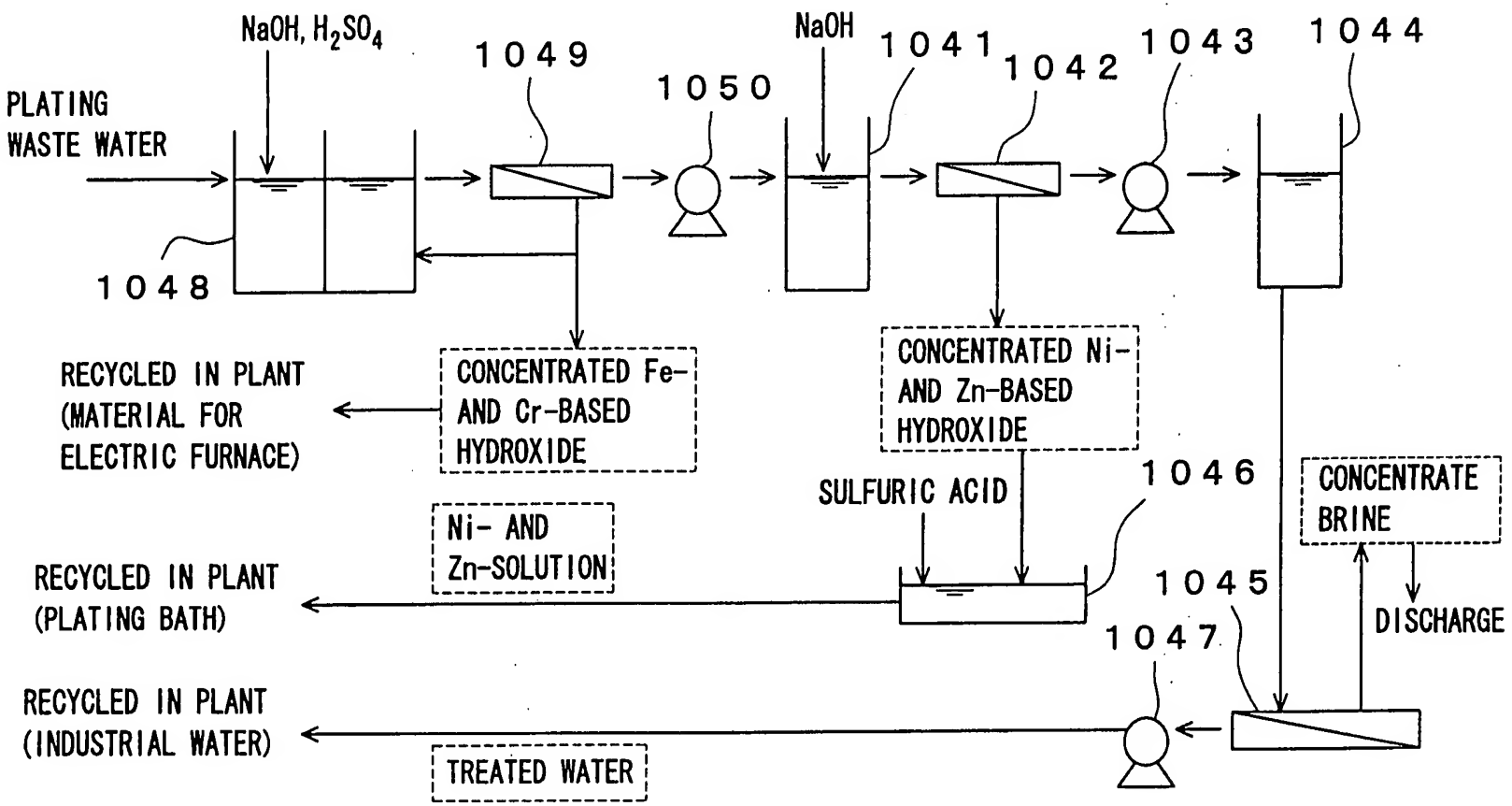
NaOH, H_2SO_4
1049
1050
NaOH
1041
1042
1043
1044
PLATING WASTE WATER
1048
RECYCLED IN PLANT (MATERIAL FOR ELECTRIC FURNACE)
CONCENTRATED Fe- AND Cr-BASED HYDROXIDE
CONCENTRATED Ni- AND Zn-BASED HYDROXIDE
SULFURIC ACID
1046
CONCENTRATE BRINE
Ni- AND Zn-SOLUTION
RECYCLED IN PLANT (PLATING BATH)
1045
1047
DISCHARGE
RECYCLED IN PLANT (INDUSTRIAL WATER)
TREATED WATER

Fig. 60